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USER'S GUIDE FOR THE NOZL3D AND NOZLIC COMPUTER PROGRAMS

P. D. Thomas, K. L. Neier, and J. F. Middlecoff

LOCKHEED MISSILES & SPACE COMPANY, INC.
Palo Alto Research Laboratories
Palo Alto, California 94304

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National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23665

C. Swanson
(Charlie) 2675

Section 1

INTRODUCTION

The NOZL3D computer program performs an implicit numerical solution to the spatially parabolized form of the three-dimensional unsteady Navier-Stokes equations in general curvilinear coordinates to predict the flowfield in and about an isolated three-dimensional jet exhaust nozzle. The equations, boundary conditions, numerical solution technique, and class of nozzle configurations addressed are presented in Reference 1, and it is assumed here that the reader is familiar with that reference. Associated with the NOZL3D code are two auxiliary codes, RGRIDD and NOZLIC. The former constructs a boundary-conforming curvilinear coordinate system and computational grid for complicated three-dimensional nozzle configurations (See Section 3 of Ref.1). NOZLIC is structured to construct the coordinate system and grid for relatively simple two-dimensional and axisymmetric converging-diverging nozzles or for external flat plate boundary layer problems, and to generate initial conditions for the NOZL3D code. The latter reads the grid and initial conditions from a file prepared by NOZLIC.

For more complicated three-dimensional nozzle configurations, the coordinate system and grid must be constructed by the RGRIDD code and stored on a disk file. NOZLIC then merely reads these grid data, generates a set of crude flowfield initial conditions, and prepares for NOZL3D a disk file containing both the grid and the initial flow conditions.

The aforementioned three programs have been designed specifically to operate on the NASA-Langley Research Center's CDC CYBER 175 computer system,which has less than 110K decimal words of fast core memory available for data and instructions. A three-dimensional flow solution carried out on a grid of 32 x 32 x 32 mesh points requires nearly 500K decimal words of memory for data and instructions. Hence, auxiliary disk files are used for primary data storage. This is accomplished as follows.

The three-dimensional flow region is represented by a computational space that consists of a rectangular parallelepiped (see Section 2.1). This computational space is covered by a rectangular grid of nodal points that are equally spaced in each of the three coordinate directions in the space. Finite-difference analogs of the unsteady Navier-Stokes equations are solved on this grid by an implicit numerical method (Ref. 1) that advances the solution over a sequence of time steps, each of which involves the following. For each of the three coordinate directions, the numerical method requires solving a block-tridiagonal system of linear equations involving all grid points that lie along a single grid line in that direction. This is termed the "sweep" for that line. All such lines running in that direction are so treated. The same process is repeated for all lines in the second coordinate direction, and again for the third direction. The flowfield data are stored by planes in an auxiliary disk file, and sufficient core memory is available to accomodate all the data required to perform the two-dimensional sweeps along all lines in one plane. This is done one plane at a time, reading in pre- sweep data from disk to core, and the reverse for post-sweep data. However, the latter data must be re-ordered to perform the third sweep that runs along the grid lines normal to the data plane.

The two data transfer operations between disk and core, each in a different order, are accomplished by an efficient Input/Output Manager routine called DMGASP (Ref. 2). Both programs, NOZLIC and NOZL3D, use the disk files for primary data

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storage and employ the DMGASP software. These basic programs also have been operated successfully on the UNIVAC 1110 computer system as well as on the CYBER 175.

Core memory-based versions of the NOZLIC and NOZL3D programs also exist, and have been exercised extensively on a CDC 7600 computer system having 300K decimal words of large core memory. The internal program structure of this version is drastically different from that of the disk file-based version. The listings, etc., presented in this User's Guide apply only to the latter version as implemented on the CDC CYBER 175 computer.

The present User's Guide contains a description of NOZL3D and NOZLIC, listings of the codes, and sufficient information to guide the user in preparing input and in interpreting output for several test cases that do not require the use of RGRIDD to generate the computational grid. A complete listing of RGRIDD is included here in Appendix C. The listing contains comment statements in subroutine INPUT that give complete instructions for preparing input and for running the RGRIDD code. The code itself is so simple and easy to use that we shall not deal with it further in the present User's Guide. A detailed exposition of the grid generation technique employed in RGRIDD is given in Section 3 of Reference 1. Recent improvements to the technique that have been implemented in RGRIDD are described in subsection 2.5 of Reference 3.

Sections 2 and 3 below describe the NOZL3D and NOZLIC codes, respectively, and their input and output. Samples of the input and output are given for several test cases . A complete copy of the NOZL3D printed output for each test case is given in Appendix D. Complete listings of the two codes are given in Appendices A and B, respectively.

Section 2

THE NOZL3D PROGRAM

2.1 Specification of Configuration Geometry and Character of Boundary Surfaces

The geometry of the nozzle configuration and of the flow regions internal and external to the nozzle are specified in Cartesian coordinates, x,y,z, where x is oriented in the general streamwise direction. The entire flow region is mapped onto a computational space consisting of a rectangular parallelpiped (see Reference 1, Sections 2.4.1 and 3). The configuration geometry and the character of the various boundary surfaces of the computational space are specified in the code by a set of integer variables that act as option selectors. The function of each option selector is summarized briefly in comment statements that are contained in the listing of subroutine INITIA (see Appendix Y). An introductory description of these functions is presented below.

Figure 2-1 illustrates the structure of the computational space for the general nozzle configuration shown in Fig. 1-1 of Ref. 1. Grid points in the computational space are denoted by the triplet of indices J, K, L, where J is associated with the streamwise Cartesian coordinate x, and the other indices are associated with curvilinear coordinates in cross-sectional planes x=const. The surface J=1 represents the upstream inflow boundary and J=JMAX represents the downstream outflow boundary. The surface K=1 represents the symmetry half-plane y=0, z≧0, and K=KMAX represents a lateral outer boundary of the flow region. For the nozzle configuration shown, the surface L=1 is also a symmetry half-plane z=0, y≧0, and L=LMAX represents the upper peripheral boundary of the flow region. The inner surfaces of the nozzle wall map onto the plane surfaces L=LW, 1≦J≦JLW and K=KW, 1≦J≦JKW. The outer surfaces of the nozzle wall map onto the surfaces L=LW+1, 1≦J≦JLW and K=KW+1, 1≦J≦JKW.

The wedge-plug maps onto the plane surface segment L=1, JL1WL≦J≦JL1WU, 1≦K≦KW. The remainder of the surface L=1 is the image in the computational space of the horizontal symmetry plane z=0. The wedge-plug may be omitted merely by specifying JL1WL=JL1WU=0. If KW=0 and JKW=0, the vertical nozzle wall is not present: the horizontal wall L=LW and L=LW+1 then extend all the way from K=1 to K=KMAX, and the wedge-plug also extends across the full range of K. The horizontal wall may be omitted by specifying LW=0, JLW=0.

Complete symmetry exists in the way the K and L directions are treated in the code, and the preceding paragraph applies to the K direction if one substitutes K for L and L for K in that paragraph.

The current program logic is subject to the following restrictions: (1) For 3D internal nozzle flow cases where the surfaces L=LMAX and K=KMAX are walls as specified by LMAXBC=KMAXBC=1 (see below), an internal wedge-plug is not allowed. (2) For the general nozzle configuration that has a wedge-plug bounded by a side-plate at K=KW, the wedge-plug may not extend beyond the side-plate in the streamwise direction, and may not be shorter than the upper nozzle wall L=LW. That is, whenever JL1WU>0, KW>0, and LW>0, the following inequality must hold: JLW≦JL1WU≦JKW. (3)The turbulence models contained in subroutine MUTUR for the jet mixing region aft of the nozzle exit are valid only when the maximum velocity in the exhaust jet exceeds the external freestream velocity. This subroutine is not valid for jet wakes that exhibit a global momentum defect relative to the external flow. This statement does not apply to local features such as the wake behind the trailing edge of a nozzle wall, sideplate, or wedge-plug (Ref. 3).

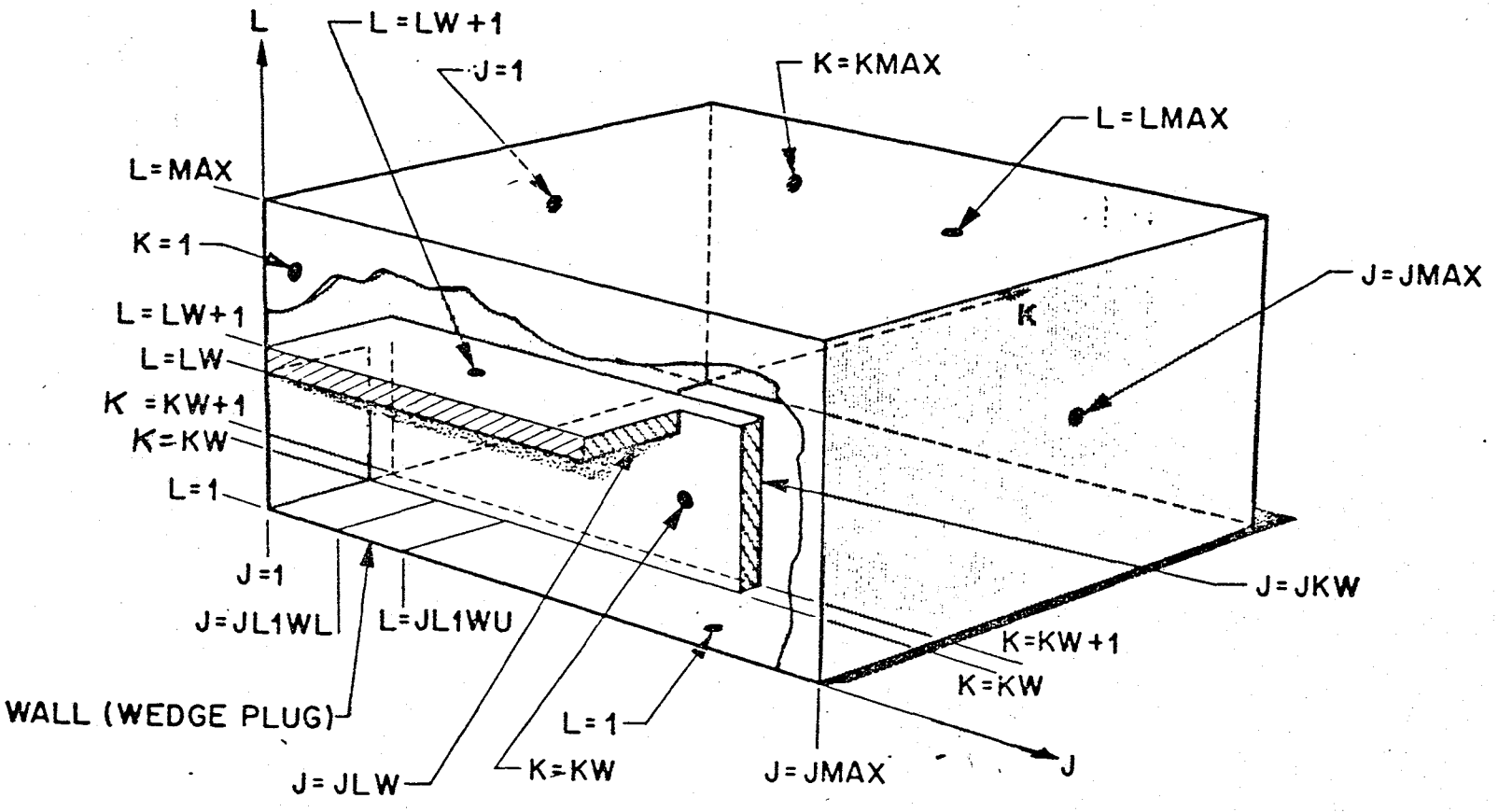

Fig. 2-1 Sketch of Computational Space Showing Indices for Geometry Specification

The character of the six peripheral faces of the computational space is specified by a set of six option selectors, one for each face. The option selectors J1BC, K1BC, L1BC determine the character of the faces J=1, K=1, L=1, respectively; whereas the selectors JMAXBC, KMAXBC, LMAXBC determine the nature of the boundary faces JMAX, KMAX, LMAX, respectively. If any of the selectors is set to zero, then all flow variables at the corresponding face are held fixed at their initial values for the duration of the computer run. The other available options for the various boundary faces are as follows.

Inflow Boundary J=1. The only additional option for this boundary is J1BC=1, which specifies that the inflow boundary conditions are to be computed implicitly as described in Section 4.2.2 of Ref. 1.

Outflow Boundary J=JMAX. There are two additional options for this boundary. For JMAXBC=1, all flow variables at the boundary are computed implicitly from the flow conservation equations as described in Section 4.2.2 of Ref. 1. The other option, JMAXBC=2 is similar, except that one of the flow conservation equations is replaced by an algebraic boundary condition which specifies that the pressure at the outflow boundary is equal to the freestream pressure. The listing of subroutine BCJMAT in Appendix A contains comment statements that explain in detail how the algebraic boundary condition on pressure is applied at the outflow boundary under this option. As indicated in Sections 2.4.6, 4.2, and 5 of Ref. 1, we recommend that this option be used only for problems in which the outflow boundary coincides with the nozzle exit plane, the nozzle is unchoked (i.e. the x-component of velocity,u, is subsonic over the entire outflow boundary), and the computation concerns only the flow region interior to the nozzle (i.e. the computational boundaries LMAX and KMAX coincide with the interior of the nozzle walls).

Lower Boundary L=1. The upper surface of the wedge-plug occupies a part of this surface L=1. Under the option L1BC=1, the implicit no-slip viscous wall boundary conditions are always applied on this part of the boundary*, (Ref. 1, Section 4.2.2) and the remainder of the surface L=1 is treated as a symmetry plane that coincides with the plane z= 0 of the base Cartesian coordinate system.

Upper Boundary L=LMAX. There are five additional options for this boundary face. For LMAXBC=1, the face is treated as an impermeable wall at which implicit no-slip boundary conditions are applied. For LMAXBC=2, implicit freestream boundary conditions are applied as described in Section 4.2.2 of Ref. 1. For LMAXBC=3, the entire boundary is treated as a symmetry plane that is parallel to the Cartesian coordinate plane y=0. For LMAXBC=4, the boundary again is a symmetry plane, but one that is parallel to the Cartesian coordinate plane z=0. For LMAXBC=5, the boundary face L=LMAX is treated as an outflow boundary at which the viscous stresses and heat conduction terms in the Navier-Stokes equations vanish, and all flow variables are computed implicitly from the full set of equations.

* The same boundary conditions are always applied on nozzle walls that are interior to the computational space (LW>0 and JLW>0, or KW>0 and JKW>0).

Observe that the designations LMAXBC=3,4 that select symmetry boundary conditions at L=LMAX are defined mnemonically. For example, when the surface L=LMAX is selected to be a symmetry plane that is parallel to the Cartesian coordinate plane y=0, the velocity component v in the y direction must vanish at the symmetry plane. The velocity component v is proportional to the third component of the flow variable vector q defined in Section 2.1 of Ref. 1, and the selection of LMAXBC=3 specifies that this third component of q vanishes at the plane of symmetry L=LMAX. Similarly, LMAXBC=4 specifies that the symmetry plane L=LMAX is parallel to the Cartesian coordinate plane z=0, whence the fourth component of q (proportional to the w-component of velocity) must vanish at the symmetry plane. Thus, in general, when the surface L=LMAX is to represent a symmetry plane at which the i'th component of q vanishes, the option selector LMAXBC should be set equal to the integer i.

Lower Boundary K=1 and Upper Boundary K=KMAX. As stated earlier, complete symmetry exists in the way the K and L directions are treated in the code. The preceding paragraphs that describe the function of the option selectors L1BC and LMAXBC apply directly to K1BC and LMAXBC if one replaces the letter L by the letter K throughout those paragraphs.

The described option selectors and geometry delimiters provide great flexibility in the types of nozzle geometry and boundary conditions that can be accommodated by the code. For example, axially symmetric configurations can be treated as follows. The symmetry axis is taken to coincide with the Cartesian X axis, and the latter is mapped onto the entire surface L=1 of the computational space by a singular transformation. By setting KW=0, JKW=0, LW>0, the inner and outer surfaces of the nozzle wall are mapped onto the planes L=LW and L=LW+1, respectively. The option KMAXBC=4 selects the surface K=KMAX to represent the horizontal symmetry plane z=0, at which appropriate symmetry boundary conditions are applied automatically by the code. The computational space then represents the first quadrant $y \geq 0$, $z \geq 0$ of the Cartesian coordinate system in which the flow computation is to be carried out.

The NOZL3D code employs a Cartesian base coordinate system. Axisymmetric flows must be treated as any other fully three-dimensional flow; that is, by using a full three-dimensional grid. The flow computation region covers the first quadrant of the Cartesian space $y \geq 0$, $z \geq 0$ as stated in the preceding paragraph, and the planes y=0 and z=0 are symmetry planes. The described quadrant (in each cross-sectional plane x=const.) is mapped onto a rectangle in the computational space as follows: ξ represents the axial coordinate x, ζ represents a stretched radial coordinate, and η represents the meridional coordinate. The computational coordinates $\xi(J)$, $\eta(K)$, $\zeta(L)$ thus resemble those of a cylindrical coordinate system in which the surface ζ=0 (L=1) represents the singular axis of symmetry, the surfaces L=LW and L=LW+1 represent the inner and outer surfaces of the nozzle wall, respectively, and the surface L=LMAX represents the lateral outer computational boundary.

The user is cautioned that whenever the NOZL3D code is used to compute an axisymmetric flow, the curvilinear coordinate transformation must be defined as described in the preceding paragraph. Grid points on the singular axis are handled in a special manner in the code, and must be situated at the index L=1 for the code to function properly. That is, the coordinate that is associated with the index L must represent the radial coordinate direction in a cross-sectional plane x=constant, the symmetry axis must coincide with the Cartesian x axis, and the surfaces K=1 and K=KMAX must represent symmetry planes that coincide with the plane y=0, $z \geq 0$ and with the plane z=0, $y \geq 0$, respectively. The code tests internally for this type of axial symmetry and automatically limits the printed output to

the vertical symmetry plane y=0 (K=1).

Configurations that possess only bilateral symmetry about the Cartesian coordinate plane y=0 can be accommodated in analogous fashion by setting KMAXBC=3, in which case the surface K=KMAX represents the lower half of the symmetry plane y=0, $z \leq 0$, and the computational space represents the Cartesian half-space $y \geq 0$.

In addition to the three-dimensional flows for which the code is primarily intended, two-dimensional flows can be computed efficiently by specifying the input option KPLANE=1. The flow then is computed only in the plane K=1, which coincides with the Cartesian coordinate plane y=0; the flow variables are presumed to possess no gradients in the y direction, and the v-component of velocity is presumed to vanish.

2.2 Input/Output Description and Test Cases

The input data required to run the code are discussed below, along with a description of the printed output. The discussion is centered about the input/output for several test cases that involve simple external flow, simple internal flow, and combined internal and external flow in and about a nozzle. The grids and initial conditions for these test cases are obtained from initial data files generated by the NOZLIC code (see Section 3).

2.2.1 Test Case No. 1: Flat Plate Boundary Layer

Aside from the body geometry, which is either computed within the NOZLIC code or generated by the RGRIDD code, the only physical input parameters that must be specified for an external flow are the dimensionless freestream Mach and Reynolds numbers, the gas specific heat ratio and Prantdl number, and the freestream temperature in degrees Kelvin. The latter is required as a reference temperature in evaluating the molecular viscosity coefficient from the Sutherland law.

The input/output description and running instructions for the code are described below and illustrated for a test case consisting of laminar external flow over a finite flat plate. The freestream Mach number is 3, the freestream Reynolds number 100,000, the Prandtl number is unity, and viscosity is proportional to temperature. Graphical results for this test case are presented in Section 5.2 of Ref. 1.

2.2.1.1 Input Data

In order to perform a flowfield computation, the code requires data on the Cartesian coordinates of the point in physical space that corresponds under the coordinate mapping to each of the grid points (j,k,l) of the computational space. The code also requires initial conditions on all physical flow variables at each grid point. These data vary from problem to problem, hence the code is designed to operate only in a "restart" mode in order to keep the code free of ad hoc instructions that apply only to individual problems. In the "restart" mode, the punched card input data is restricted to a relatively small set of general parameters. The problem-dependent grid point coordinates and initial flow variable data are read from a data file. For a new run, the latter file is prepared by an auxiliary code, NOZLIC (See Section 3). An equivalent restart file also is generated by the NOZL3D code itself at the conclusion of a run, so that the computation can be continued in a subsequent restart run from the point at which the initial run terminated. Restart files can also be generated at user-selected intervals during the course of a run.

The punched card input data include the geometry options selectors, the phy-

sical parameters of the problem, and various selectors that govern file input, output, running mode, and number and size of time steps. These are contained on five cards. Card images with the proper inputs for the test case are shown in Fig. 2-2. The first two cards contain integer data in 16I5 format, and the final three cards contain real number data in 8F10.0 format.

The first page of printed output displays and identifies the input data items in the exact sequential order of their appearance on the input cards. This output page for the test case is shown in Fig. 2-3. Those items not already described in Section 2.1 are identified below.

NMAX - Number of time steps to be taken during the run.

JMAX,KMAX,LMAX - Number of grid points in J, K, L directions, respectively.

LAMIN - Laminar/turbulent flow option selector, 1 for laminar flow, 0 for turbulent flow.

KPLANE - Planar symmetry option selector. Use 0 for three-dimensional problems. Use 1 to conserve computer time for two-dimensional problems where gradients occur only in the J, L, directions , and the flow is invariant with respect to K.

IWRIT - IWRIT=1 produces a printout of all initial data for the current run, as read for an initial start run from the file prepared by the NOZLIC code, or as read for a restart run from the restart data file. The initial data are not printed if IWRIT=0 is input.

NRST - Time step index at which the current run is initiated. For the initial run that obtains the initial data from the file prepared by the NOZLIC code, input the value NRST=0. For a restart run that obtains the initial data from a restart file generated during a previous run, NRST must agree with the time step index NC of the data on the restart file

KVIS, LVIS, KLVIS - Switches that allow the user to select whether the viscous terms associated with a given coordinate direction are to be computed or omitted. For example, KVIS=1 specifies that the viscous terms associated with the K coordinate direction are to be computed, whereas those terms are omitted from the computation if KVIS=0. The switch LVIS=1(0) acts similarly for the L coordinate direction. KLVIS=1(0) similarly controls the viscous cross-derivative terms that involve both the K and L coordinate directions. For two-dimensional plane flows where KPLANE=1 is input, default values KVIS=KLVIS=0, LVIS=1 are selected automatically by the code.

ISUTH - Option selector for computing the molecular viscosity coefficient RMUE either from the Sutherland law when ISUTH=1 is input, or as a power of temperature when ISUTH=0 is input. The viscosity coefficient is computed in subroutine VISCOF.

NROUT - Number of time steps interval between points at which a restart file is generated; i.e., a restart file is generated on unit 4 every NROUT time steps. The entire flowfied is printed out each time a new restart file is created.

DT - Time stepsize to be use initially (see DTFAC below).

FSMACH - Freestream Mach number for external flow problems or for problems involving both external flow about the nozzle and internal flow in the nozzle.

RMACH - Reference Mach number. For external flow problems, this is the free-stream Mach number FSMACH. For purely internal flow in a nozzle or for combined internal and external flow, use RMACH=1.0.

```
  200   15    1   15    1    0    0    1    1    1    0    0    0    0    3
    1    1   15    0    0    2    0    0    0   50    1    1    1    0    0   50
0.01       3.0        3.0        100000.0  1.0        300.0      1.0        1.0
1.4        1.0        0.0        0.0       1.1        0.0        0.1        0.0
0.01
```

Input Data Card Images - Test Case No. 1
FIG. 2-2

```
 NMAX    JMAX    KMAX    LMAX    LAMIN   INVISC  JIBC    JMAXBC  KPLANE  KIBC    JKIWL   JKIWU   KW      JKW     KMAXBC
 200     15      1       15      1       0       0       1       1       1       0       0       0       0       3

 LIBC    JLIWL   JLIWU   LW      JLW     LMAXBC  NRST    IWRIT   NGRI    NP      KVIS    LVIS    KLVIS   INFLT   ISUTH   NROUT
 1       1       15      0       0       2       0       0       0       50      1       1       1       0       0       50

 DT              FSMACH          RMACH           RE              PR              RTDEGK          FSP             FST
1.0000000-02    3.0000000+00    3.0000000+00    1.0000000+05    1.0000000+00    3.0000000+02    1.0000000+00    1.0000000+00

 GAMMA           RMUEXP          TW              CNBR            DTFAC           RM              SMU             OMEGA
1.4000000+00    1.0000000+00    .0000000        .0000000        1.1000000+00    .0000000        1.0000000-01    .0000000

 DTMAX
1.0000000-02


   THIS IS A RESTART FROM THE FOLLOWING INITIAL CONDITIONS
KMAXR,JMAXR,LMAXR,ITMAXR,LMAXBC,LIBC,FSMACH,GAMMA,RE,SMUR,DTR,ALP,CNBR,PRR
     1       15      15      200     2       1
 .30000000+01    .14000000+01    .10000000+06    .10000000+00    .10000000-01    .00000000       .00000000       .10000000+01

THROAT LOCATION X=0. AT JTT=  1
THROAT AREA AT=  6.66203-02
```

Output Page for Test Case No. 1
FIG. 2-3

RE - Reference Reynolds number. For external flow problems, this is the freestream Reynolds number. For purely internal flow in a nozzle, or for problems where both the internal flow and the external flow about the nozzle are to be computed simultaneously in a single run, use the Reynolds number based on internal flow stagnation conditions with the stagnation sound speed as the characteristic velocity.

PR - Prandtl number.

RTDEGK - Reference temperature in degrees Kelvin that is used in evaluating the molecular viscosity coefficient from the Sutherland law when ISUTH=1 is input. It should be equal to the reference temperature at which the Reynolds number is defined.

FSP,FST - Dimensionless freestream static pressure and temperature. For purely external flows, use FSP=FST=1. For combined internal and external flows, these are defined as the dimensional free stream values normalized by the dimensional reference pressure and temperature, respectively (i.e., the internal flow stagnation chamber conditions). Note that FSP is defined in the same fashion for purely internal nozzle flow under unchoked conditions where the freestream pressure is imposed as a boundary condition at the nozzle exit plane J=JMAX (see Ref. 1, Section 2.2 and Ref. 3, Section 2.3.2).

GAMMA - Gas specific heat ratio

RMUEXP - Exponent of temperature in power law expression for the molecular viscosity coefficient (used only when ISUTH=0 is input).

TW - Dimensionless wall temperature boundary condition (normalized by the reference temperature). To invoke adiabatic wall boundary conditions, input the value TW=0.0.

DTFAC, OMEGA, DTMAX - These quantities enable the user to vary the time step during the course of a run. The inputs DTFAC=1.0, OMEGA=0.0 force the code to use the input value of the time step, DT, for the entire run. When DTFAC>1.0 , OMEGA>0.0 are input, the code will automatically increase the time step as follows. Upon completing a step of stepsize DT, the code determines the maximum (in absolute value) relative change in any flow variable q at any grid point that took place over the step. If the change is less than the input value OMEGA, then the time stepsize for the subsequent step is increased by the factor DTFAC. DTMAX simply is a user-selected upper bound on the time step.

RM - Coefficient of artificial implicit dissipation operator (Ref. 3). No dissipation is applied when RM=0.0 is input.

SMU- Coefficient of explicit fourth-order smoothing operator (Ref. 1, Section 4.3 and Ref. 3, Section 5.3). Must be less than unity. Larger values will cause numerical instabilities.

INFLT - Option selector for automatic filtering of the computed flow variables at the inflow plane (Ref. 3, Section 2.4). The filter is applied when INFLT=1, and is omitted when INFLT=0.

The remaining input data items INVISC, NGRI, NP, and CNBR, have internal significance in the code and must be given the values shown in Fig. 2-3.

The DMGASP routine uses macros from the system file. This file is named COM430/MASTER. In order to compile, the following control commands should be included in the deck:

```
ATTACH(OPL/UN=LIBRARY)
FTN(I=COMPILE,X=OPL,OPT=2,...)
```

2.2.1.2 Printed Output of Computed Results

The complete printed output for the test case is given in Appendix D. The output that follows the display of input data consists of two sections that have the same format. The first section is given only when IWRIT=1 is input, and lists the starting data that were read from unit 2; these data include the Cartesian coordinates of grid points and the initial values of physical flow variables at each grid point. The first few lines display several input items that are redundant with the punched card input described in Section 2.2.1.2. These items are obtained from the initial data file prepared by the NOZLIC code, and are displayed for reference purposes only. They do not affect the NOZL3D code run, which is governed solely by the input data described in Section 2.2.1.1.

The tabular output that follows the described lines lists by column the grid point indices, the grid point coordinates,x,y,z; the dimensionless density R; Cartesian velocity components U,V,W; and the dimensionless temperature T, pressure P, and entropy function ENT. The non-dimensionalization is as described in Section 2.1.1 of Reference 1. Velocities are normalized by the sound speed at the reference conditions and distances are normalized by the reference length. All other variables are normalized by the corresponding variables at the reference state. For external flows, as in Test Case No.1, the reference conditions are taken as the freestream conditions. For purely internal nozzle flows or for combined internal and external flow, the variables are referenced to the isentropic stagnation conditions of the internal nozzle flow.

The final section of printed output lists the values of the same quantities after NMAX time steps. Note that for two-dimensional flow (KPLANE=1), the full printed output is given only for the plane K=1.

Between the described major sections of output, three lines of intermediate data are printed at the end of each time step that enable the user to monitor the progress of the run. The first line gives the time step index NC, the current value of the L2 residual, the maximum residual, and the grid point indices J,K,L of the point at which the maximum occurred. The L2 residual is defined as the root-mean-square, taken over all interior grid points, of the spatially differentiated terms in the Navier-Stokes equations, including the fourth-order smoothing operators. These spatially differentiated terms are those that appear in braces on the right hand side of Eq. (4.17) of Reference 1.

The second line of intermediate output repeats the time step index and gives the time stepsize DT, the cumulative time TAU, the maximum relative change over the time step that occurred in any of the five components Q(N), N=1,2,...,5 of the flow variable vector q at any grid point. The indices J,K,L of the grid point where the maximum occurred are also printed, along with the index N that identifies which component of q experienced the greatest relative change.

The third line of printed output lists the five components of the generalized force vector GF(N), N=1,2,..,5, and the current value of the nozzle discharge coefficient CW. For Test Case No. 1, the second component GF(2) of the generalized force vector represents the dimensionless drag coefficient CD of the plate. A general discussion of the meaning of the generalized force vector is given in Section 3 of Reference 3.

2.2.2 Test Case No.2: Two-Dimensional Internal Flow

Test case No. 2 is a computation of laminar flow in a so-called "two-dimensional" nozzle that has straight sidewalls and a rectangular cross section of constant width. The inlet section is of constant height. This is followed by a straight-walled converging section that is connected to a straight

diverging section by a circular arc that forms the geometric throat region. The nozzle configuration is described in Section 6.1 of Ref. 3, which also presents a discussion of the numerical results. We note only that the nozzle width is 4 in. between sidewalls, and the throat half-height is 0.5388 inches. The latter is the reference length by which all dimensions are normalized in the NOZL3D computation. For this test case, only the two dimensional flow in the vertical plane of symmetry of the nozzle is considered. See section 2.2.3 for the three-dimensional flow test case for this nozzle (Test Case No. 3).

The two-dimensional flow test case is for nozzle operating conditions corresponding to the nozzle design condition with a stagnation pressure of 1 atm. and a stagnation temperature of 295 Kelvin. The Reynolds number based on stagnation chamber conditions and throat half-height is 940,000. Although one would expect turbulent flow at this large a Reynolds Number, the test case assumes laminar flow with a Sutherland viscosity law, a Prandtl number of 0.72, and adiabatic wall boundary conditions. The flow is computed in the upper half of the vertical plane of symmetry $y=0$, $z \geq 0$, which is covered by a 23x15 grid in the x(j) and z(l) directions, respectively. The vertical (z) grid is stretched exponentially to resolve the nozzle wall boundary layer.

The computation is performed in two stages: an initial run of constant time stepsize DT=0.05 with J1BC=0 (inflow conditions held fixed at their initial values), and a restart run with J1BC=1 (computed inflow conditions) using a variable time stepsize.

The input data card images for the initial start are shown in Fig. 2-4 and the first printed output page is displayed in Fig. 2-5. The remainder of the printed output for both runs is contained in Appendix D. The output format is as described in Section 2.2.1.2.

Aside from J1BC, the other inputs for the restart run that differ from those of the initial start are: NMAX=400, NRST=100, IWRIT=0, NROUT=400, DTFAC=1.1, OMEGA=0.01, and DTMAX=0.3.

For internal flows as in test case no. 2, the generalized forces GF(N) have the following physical meaning (Ref. 3, Section 3):

GF(1) is the net mass flux through the computational space

GF(2), GF(3), and GF(4) represent the global momentum defect in the Cartesian x,y, and z directions, respectively, for the entire computational space. At steady state, these are equal to the x,y, and z components of the force exerted on the nozzle walls.

GF(5) is the net energy flux through the computational space.

The printed values of the generalized forces are dimensionless, with mass flux normalized by the product of the reference density, the reference sound speed, and the square of the reference length; momentum fluxes are normalized by one-half the product of the described reference mass flux and the reference sound speed; the energy flux is normalized by the product of the described reference momentum flux and the reference sound speed. Recall that the reference density for purely external flows is the freestream density, and for either internal or combined internal and external flow is the stagnation chamber density of the internal nozzle flow. The reference velocity is defined similarly as either the freestream or stagnation chamber sound speed.

```
  100   23    1   15    1    0    0    1    1    1    0    0    0    0    3
    1    0    0    0    0    1    0    1    0   50    1    1    1    0    1  100
0.05       1.0       1.0       940000.0  .72       295.       1.0       1.0
1.4        1.0       0.0       0.0       1.0       0.0        .05       0.0
0.05
```

Input Data Card Images - Test Case No. 2
FIG. 2-4

NMAX	JMAX	KMAX	LMAX	LAMIN	INVISC	JIBC	JMAXBC	KPLANE	KIBC	JK1WL	JK1WU	KW	JKW	KMAXBC
100	23	1	15	1	0	0	1	1	1	0	0	0	0	3

LIBC	JL1WL	JL1WU	LW	JLW	LMAXBC	NRST	IWRIT	NGRI	NP	KVIS	LVIS	KLVIS	INFLT	ISUTH	NROUT
1	0	0	0	0	1	0	1	0	50	1	1	1	0	1	100

DT	FSMACH	RMACH	RE	PR	RTDEGK	FSP	FST
5.0000000-02	1.0000000+00	1.0000000+00	9.4000000+05	7.2000000-01	2.9500000+02	1.0000000+00	1.0000000+00

GAMMA	RMUEXP	TW	CNBR	DTFAC	RM	SMU	OMEGA
1.4000000+00	1.0000000+00	.0000000	.0000000	1.0000000+00	.0000000	5.0000000-02	.0000000

DTMAX
5.0000000-02

THIS IS A RESTART FROM THE FOLLOWING INITIAL CONDITIONS

KMAXR,JMAXR,LMAXR,ITMAXR,LMAXBC,LIBC,FSMACH,GAMMA,RE,SMUR,DTR,ALP,CNBR,PRR								
1	23	15	100	1	1			
.10000000+01	.14000000+01	.94000000+06	.50000000-01	.50000000-01	.00000000	.00000000	.72000000+00	

Output Page for Test Case No. 2
FIG. 2-5

2.2.3 Test Case No. 3: Three-Dimensional Internal Flow

Test Case No. 3 is a three-dimensional flow computation for the same nozzle configuration dealt with in the two-dimensional flow computation of Test Case No. 2. The vertical (z) and streamwise(x) grids are the same for both cases. For the 3-D case, 10 grid points are distributed between the vertical symmetry plane y=0 and the nozzle sidewall with an exponential stretching to resolve the sidewall boundary layer. The nozzle operating conditions are identical to those for Case No. 2. However, the initial time step is smaller.

The input data card images and the first output page are shown in Figs. 2-6 and 2-7, respectively. To familiarize the reader with the restart feature of the code, two restarts are performed. The initial start is for 100 steps with the boundary condition option selector J1BC=0 (inflow boundary conditions are held fixed at their initial values). The first restart continues the computation for 200 more steps using the same stepsize at which the initial start terminated at step 100. The other inputs for the restart run which differ from those of the initial start run are: J1BC=1, NRST=100, OMEGA=0.03, and DTMAX=0.3,

The second restart continues the calculation for 200 more steps with J1BC=1 (implicit computed inflow boundary conditions). The input data for the restart run which differs from that for the initial start run are: NMAX=200, J1BC=1, NRST=300, SMU=0.8, DT=0.05, OMEGA =0.05, and DTMAX=0.3.

Note that the explicit smoothing coefficient is set to 0.8 for the restart. As part of the feature that automatically raises the time step by the factor DTFAC whenever the maximum change in any flow variable over the preceding step is less than the input constant OMEGA, the explicit smoothing coefficient is also increased by the same factor until an upper bound value of SMU=0.8 is reached. The smoothing coefficient is raised in this fashion along with the time stepsize in order to preserve the same relative magnitudes between the smoothing terms and the spatially differentiated terms in the Navier-Stokes equations. The value of SMU is limited by the linear stability boundary of the set of smoothing terms, which is unity. An upper bound of 0.8 is currently used in the code for conservatism to avoid potential nonlinearity-induced instabilities that are not accounted for in the linear stability analysis. A discussion of the meaning of the coefficient SMU is given in Section 5.3 of Reference 3.

The full printed output for the initial start and the final restart runs is contained in Appendix D.

```
  100   23   10   15    1    0    0    1    0    1    0    0    0    0    1
    1    0    0    0    0    1    0    1    0   25    1    1    1    0    1  100
.01       1.        1.                  9.4E5 .72       295.       1.        1.
1.4       1.        0.        0.              1.1       0.        .5        .01
.05
```

Input Data Card Images - Test Case No. 3
FIG. 2-6

NMAX	JMAX	KMAX	LMAX	LAMIN	INVISC	JIBC	JMAXBC	KPLANE	KIBC	JKIWL	JKIWU	KW	JKW	KMAXBC
100	23	10	15	1	0	0	1	0	1	0	0	0	0	1

LIBC	JLIWL	JLIWU	LW	JLW	LMAXBC	NRST	IWRIT	NGRI	NP	KVIS	LVIS	KLVIS	INFLT	ISUTH	NROUT
1	0	0	0	0	1	0	1	0	25	1	1	1	0	1	100

DT	FSMACH	RMACH	RE	PR	RTDEGK	FSP	FST
1.0000000-02	1.0000000+00	1.0000000+00	9.4000000+05	7.2000000-01	2.9500000+02	1.0000000+00	1.0000000+00

GAMMA	RMUEXP	TW	CNBR	DTFAC	RM	SMU	OMEGA
1.4000000+00	1.0000000+00	.0000000	.0000000	1.1000000+00	.0000000	5.0000000-01	1.0000000-02

DTMAX
5.0000000-02

THIS IS A RESTART FROM THE FOLLOWING INITIAL CONDITIONS

KMAXR,	JMAXR,	LMAXR,	ITMAXR,	LMAXBC,	LIBC,	FSMACH,	GAMMA,	RE,	SMUR,	DTR,	ALP,	CNBR,	PRR
10	23	15	0	1	1								
.10000000+01	.14000000+01	.94000000+06	.50000000-01	.10000000-01	.00000000	.00000000	.72000000+00						

Output Page for Test Case No. 3
FIG. 2-7

2.2.4 Test Case No. 4: Internal and External Flow for an Axisymmetric Nozzle

A detailed description of the nozzle configuration is presented in Section 6.2 of Ref. 3, along with graphical results of the computation. We note here only that the nozzle interior wall has an inlet section of constant radius, a convergent section, and an exit section of constant radius. The external wall of the nozzle consists of an initial section of constant radius, followed by a circular arc boattail. The lateral outer boundary of the computational space, L=LMAX, is a cylinder in the Cartesian space x,y,z. The downstream outflow boundary is located about one exit diameter aft of the nozzle exit so as to include the near-field exhaust jet and the wake of the nozzle wall in the flow computation. The grid consists of KMAX=5 meridional planes equally spaced at intervals of 22.5 degrees, JMAX=28 cross-sectional planes along the x direction, of which the last five are downstream of the nozzle exit (JLW=23), LW=15 grid points exponentially distributed across the interior of the nozzle in the radial direction, and another 13 points exponentially distributed in the radial direction between the outer nozzle wall and the lateral outer "freestream" computational boundary (LMAX=28).

The calculation is for turbulent flow with a Sutherland molecular viscosity, Pr=0.72, Re=1,100,000, and a freestream Mach number of 0.8. The internal flow stagnation temperature and pressure are 300 Kelvin and 1.32 atm., the freestream stagnation temperature is 275 Kelvin, and the freestream pressure is one-half the internal flow stagnation chamber pressure.

The test computation consists of a 100-step initial start run with J1BC=0, followed by four restart runs which employ J1BC=1. Figures 2-8 and 2-9 show the input data card images and the first page of printed output for the initial start. The remainder of the printed output for the initial start and final restart are given in Appendix D. Note that the code tests internally for axial symmetry, and automatically limits the printed output to cover only the vertical plane y=0, $z \geq 0$.

For each restart run, the input data which differ from the input data shown above for the initial start are as follows. All restarts employ J1BC=1. For the first restart, NRST=100, OMEGA=0.02. For the second restart, NRST=200, DT=0.15, SMU=0.8, OMEGA=0.03, and DTMAX=0.25. For the third restart, NRST=300, DT= 0.2196, SMU=0.8, OMEGA=0.03, and DTMAX=0.25. For the fourth restart, NRST=400, DT=0.25, OMEGA=0.0, DTMAX=0.25, and SMU=0.8.

```
  100   28    5   28    0    0    0    1    0    1    0    0    0    0    4
    1    0    0   15   23    2    0    1    0   50    0    1    0    0    1  100
.05       .8        1.0             1.1E6 .72       300.       .5        .98
1.4       1.        0.         0.        1.1        0.        .5        .05
.15
```

Input Data Card Images - Test Case No. 4
FIG. 2-8

NMAX	JMAX	KMAX	LMAX	LAMIN	INVISC	JIBC	JMAXBC	KPLANE	KIBC	JKIWL	JKIWU	KW	JKW	KMAXBC
100	28	5	28	0	0	0	1	0	1	0	0	0	0	4

LIBC	JLIWL	JLIWU	LW	JLW	LMAXBC	NRST	IWRIT	NGRI	NP	KVIS	LVIS	KLVIS	INFLT	ISUTH	NROUT
1	0	0	15	23	2	0	1	0	50	0	1	0	0	1	100

DT	FSMACH	RMACH	RE	PR	RTDEGK	FSP	FST
5.0000000-02	8.0000000-01	1.0000000+00	1.1000000+06	7.2000000-01	3.0000000+02	5.0000000-01	9.8000000-01

GAMMA	RMUEXP	TW	CNBR	DTFAC	RM	SMU	OMEGA
1.4000000+00	1.0000000+00	.0000000	.0000000	1.1000000+00	.0000000	5.0000000-01	5.0000000-02

DTMAX
1.5000000-01

THIS IS A RESTART FROM THE FOLLOWING INITIAL CONDITIONS

KMAXR,	JMAXR,	LMAXR,	ITMAXR,	LMAXBC,	LIBC,	FSMACH,	GAMMA,	RE,	SMUR,	DTR,	ALP,	CNBR,	PRR
5	28	28	0	2	1								
.80000000+00	.14000000+01	.11000000+07	.50000000+00	.50000000-01	.00000000	.00000000	.72000000+00						

Output Page for Test Case No. 4
FIG. 2-9

Section 3

THE NOZLIC PROGRAM

NOZLIC constructs the curvilinear coordinate system and grid for two- dimensional or axisymmetric flow configurations, and generates initial conditions for NOZL3D. For general three-dimensional nozzle configurations, NOZLIC merely reads the coordinate system and grid from a file prepared by the RGRIDD grid generator code, and sets up crude initial flowfield conditions.

Section 3.1 describes in general terms the input data required to operate the NOZLIC code. The major subroutines and their functions are outlined briefly in section 3.2. Sections 3.3 to 3.6 present the specific input data for a variety of two dimensional and axisymmetric test cases that do not require the use of the RGRIDD code to generate the grid. The latter sections discuss in detail how the grid and flowfield initial conditions are constructed by NOZLIC for each class of flow problem. The test cases are those for which the NOZL3D code input, output, and running instructions have been given in Section 2. The grid and initial conditions produced by NOZLIC for each test case are written on a disk file on unit 4. An optional printout of these data can also be obtained from a NOZLIC run. For the test cases presented in Sections 3.3 to 3.6, this printed output is omitted because it is identical to the initial output provided by the NOZL3D code under the option IWRIT=1 (see Section 2.2.1.2 and Appendix D).

No test case is given for the general nozzle configuration whose image in the computational space is as depicted in Fig. 2.1 and that employs the RGRIDD code to generate the grid. However, the manner in which the RGRIDD output is used by NOZLIC and the manner in which the flowfield initial conditions are constructed on this grid are described in detail in Sections 3.1 and 3.2.

3.1 INPUT DATA

Many of the input data items required by the NOZLIC and NOZL3D codes are the same. To avoid confusion, the first four cards of input data for the NOZLIC code are identical to those for NOZL3D. The last of the five NOZL3D data cards is omitted from the input data card set of NOZLIC because it contains only one item that is irrelevant to NOZLIC. Further input data are required by NOZLIC and are to be supplied on additional cards as described below.

The fifth and sixth cards are in 16I5 and 8F10.0 formats, respectively, and contain the following items:

NOPT - Option selector for type of flow configuration. Use NOPT=0 for external flat plate boundary layer flow, NOPT=1 for two-dimensional internal nozzle flow (including so-called "two-dimensional" nozzles that really are three-dimensional, but have a rectangular cross section and flat sidewalls), NOPT=2 for axisymmetric flow, and NOPT=3 for general three-dimensional nozzle configurations.

JREADX - Option selector that governs the automatic construction of a grid x(j) in the Cartesian x direction when the grid is not read in from a file (see IRGRID below). JREADX=0 produces a uniformly spaced x-grid of JMAX points in the region XZERO$\leq$x$\leq$XMAX. If a nonuniform grid x(j) is desired, JREADX specifies the number of values x(j) that are to be read in, starting on input data card 7. If JREADX is non-zero, its value must agree with the input number JMAX, which specifies the total number of grid points in the x direction.

IGEOM - An option selector for the geometric configuration of two- dimensional

nozzles. It is used only when NOPT=1, and specifies which of the nozzle geometries is to be selected from among those programmed into subroutine GEOM. The latter subroutine currently contains the following geometries: (i)Cosine nozzle (IGEOM=1) configuration described in Section 5.1, Ref. 3. (ii)Two-dimensional converging-diverging nozzle (IGEOM=2) configuration described in Section 6.1, Ref. 3. Each of these nozzle geometries is specified in subroutine GEOM by the functions z(x) and A(x), where z(x) is the wall contour and A(x) is the cross-sectional area.

KREADY - Option selector that governs the automatic construction of a grid y(k) in the Cartesian y direction for two-dimensional nozzle configurations or for simple three-dimensional configurations having a rectangular cross section and flat sidewalls. This option, like JREADX, is used only when the grid is not read from a file (i.e., when IRGRID=0). The option KREADY=0 produces a uniformly spaced y(k) grid of KMAX points in the region $0 \leq y \leq YMAX$. If a nonuniform grid is desired, KREADY specifies the number of values of y(k) that are to be read in following the array x(j) that specifies the grid for the x direction. If the input data satisfy the inequality $0 < KREADY < KMAX$, the the code automatically constructs the remainder of the y grid by distributing the additional points exponentially between the last input value y(KREADY) and the input YMAX described below. The exponential stretching is controlled by the input quantity FN described below. For axisymmetric flow (NOPT=2), KREADY=0 must be input.

IRGRID - Specifies whether the grid is to be constructed by the NOZLIC code (IRGRID=0) or is to be read in from a data file contained on unit 3 (IRGRID=1). Note that the RGRIDD code writes this file to unit 2.

ICRUDE - Specifies whether the initial conditions are to be computed by subroutine INITQ or by subroutine CRUDIC. The functions of these subroutines is discussed later in Section 3.2.

ITOT, INWALL - These inputs are used only for axisymmetric flows (NOPT =2) and should be set to zero for other cases. ITOT and INWALL are integers associated with the specification of boundary conditions at the inflow plane. For ITOT>0, the inflow boundary conditions are read in from the last set of data cards (8F10.0 format). The latter data specify the radial distributions of total pressure, of total temperature, and of the ratio between the radial and axial velocity components. These data are to be supplied in sets that specify in order the radial location RI and the non-dimensional boundary conditions at that location: total pressure PTI, total temperature HTI, and velocity component ratio VROUI. ITOT is the total number of such sets to be read in, and INWALL is the index of the set that corresponds to the interior surface of the nozzle wall. The inflow boundary conditions at actual grid points are obtained from this input array by linear interpolation once the grid is constructed. If ITOT=INWALL=0, ICRUDE=1 are input with the axisymmetric flow option NOPT=2, the described boundary condition array is not read in as part of the input data, but is computed in subroutine INFLOW from the initial flowfield conditions that are set up by subroutine CRUDIC.

The sixth input data card specifies the following information in 8F10.0 format.

XZERO,XMAX - These specify, respectively, the Cartesian coordinates x(j=1) and x(j=JMAX) of the inflow and outflow planes.

FN - Coordinate stretching parameter. For external flat plate boundary layer flow (NOPT=0), FN specifies the location of the upper computational boundary ZMAX in units of the estimated boundary layer thickness. For example, FN=10 specifies that the boundary is located a distance of 10 boundary layer thicknesses above the plate. The boundary layer thickness is estimated automatically in terms of the freestream Mach number FSMACH. An exponential stretching function automatically tailors the vertical (z) grid to place half the grid points between the plate surface and the estimated boundary layer edge. For either two-dimensional internal flow in a nozzle or for three-dimensional internal flow in a so-called "two-dimensional" nozzle with flat sidewalls and a rectangular cross section (NOPT=1), the input FN<1 controls the exponentially stretched grid point distribution in the vertical z(l) direction so that, at each streamwise station x(j), half the grid points lie in the region $z/zmax(x) \leq FN$, where zmax(x) is the local height of the nozzle wall at station x. The nozzle wall shape zmax(x) is specified by a function statement in subroutine GEOM. For the case of a three-dimensional nozzle with flat sidewalls, the remainder of the transverse y grid that is not read in under the KREADY>0 option is stretched automatically so that the transverse grid spacing Δy at the sidewall y=ymax is the same at each x station as the vertical grid spacing Δz at the upper nozzle wall z=zmax(x).

YMAX - This input is used only for options NOPT=0,1, and specifies the Cartesian coordinate y(K=KMAX). For the flat plate boundary layer, NOPT=0, YMAX is the half-width of the plate. For a "two-dimensional" nozzle with flat sidewalls and a rectangular cross section (NOPT=1), YMAX is the half-width of the nozzle, i.e., the distance from the vertical symmetry plane y=0 to the nozzle sidewall.

For complicated nozzle configurations (NOPT=3) where the grid is read in (IRGRID=1) and the initial conditions are computed by subroutine CRUDIC (see Section 3.2), the inflow boundary conditions must be supplied on a final set of input data cards that follow all other input cards. This final card set specifies the boundary conditions on the total pressure PTOT, total temperature HTOT, and the ratios VOU (v/u) and WOU (w/u) of the transverse Cartesian velocity components v,w to the normal component u at each grid point K,L of the inflow plane. These data, one set per card, must appear in the following order: L, K, PTOT, HTOT, VOU, WOU. The first two items on each card are in 2I5 format, and the last four are in 4F10.0 format. The total number of data sets (cards) must be equal to the product of the input integers KMAX and LMAX that are contained on the first NOZLIC input card, since the product represents the total number of grid points that lie in the inflow plane.

The DMGASP routine uses macros from the system file. This file is named COM430/MASTER. In order to compile, the following control commands should be included in the deck:

```
ATTACH(OPL/UN=LIBRARY)
FTN(I=COMPILE,X=OPL,OPT=2,...)
```

3.2 MAJOR SUBROUTINES

The major subroutines of the NOZLIC code and the functions performed by each are outlined below.

MAIN. This routine controls the logical flow and calls the principal subroutines.

INPUT. This subroutine reads the input data. It also prints out all the inputs, as well as the other derived data such as the inflow boundary conditions that are computed automatically under NOPT=2 when ITOT=INWALL=0, ICRUDE=1.

NDLPTS. This subroutine either reads the curvilinear coordinate system and grid for complicated nozzle configurations (IRGRID=1, NOPT=3) or constructs the grid for simpler problems (IRGRID=0, NOPT=0,1,2). The fashion in which the grid is constructed under each of the latter options is described in subsequent sections of this user's guide that deal with individual test cases.

INITQ. This subroutine sets up the flowfield initial conditions for relatively simple configurations (NOPT=0,1,2). The manner in which the initial conditions are computed under each of the latter options is described in subsequent sections of this user's guide that deal with individual test cases.

CRUDIC. This subroutine sets up crude initial conditions, and must be used (ICRUDE=1) for complicated nozzle configurations (NOPT=3) where the grid is read in (IRGRID=1). Because the present user's guide does not include a test case that exercises subroutine CRUDIC, we shall outline briefly below how the latter computes crude initial conditions for the interior and exterior flow regions of a general nozzle whose configuration in the computational space is as illustrated in Fig. 2-1.

The reader is reminded that, for such combined interior and exterior flows, the non-dimensional variables used in both the NOZLIC and NOZL3D codes are defined so that variables such as pressure, density, and temperature are normalized by the corresponding internal flow stagnation chamber conditions, whereas velocities are normalized by the stagnation chamber sound speed. The initial conditions are specified in terms of the non-dimensional five-component flow variable vector **q** at each grid point (see Ref. 1, Section 2.1).

The boundary conditions on total pressure, total temperature, and velocity vector direction cosines at all grid points (J,K,L) of the inflow plane J = 1 are read in as input data. At all other grid points (J,K,L), J > 1, the velocity vector is forced to be tangent to the grid lines K,L = constant along which J alone varies. The total pressure and total temperature along each such grid line is taken to be constant and equal to its value at the inflow plane J = 1. This allows all flow variables to be computed at any grid point if the local static pressure is specified at the point. At points outside the nozzle, $K \geqq KW + 1$, $L \geqq LW + 1$, the static pressure is set equal to the freestream pressure FSP. The latter pressure also is used at points $K \leqq KW$, $L \leqq LW$ that lie in the region $J \geqq \min(JKW, JLW)$ downstream of the nozzle exit. Inside the nozzle $L \leqq LW$, $K \leqq KW$, $J < \min(JKW, JLW)$ the static pressure is computed from the one-dimensional, inviscid, isentropic flow relations using the actual nozzle internal area variation under the assumption that the flow is choked at the geometric throat X = 0. This internal pressure is taken to be uniform over the nozzle cross section at each streamwise station x(J).

3.3 TEST CASE NO. 1: FLAT PLATE BOUNDARY LAYER

The flow conditions for this test case already have been described in Section 2.2.1.

3.3.1 Description of Grid and Initial Conditions

The plate occupies the portion of the Cartesian coordinate plane z=0 that lies in the region $0 \leq XZERO \leq XMAX$, $-1/2 \leq y \leq 1/2$. The inflow and outflow boundaries are placed at X=XZERO and XMAX, respectively. For given input values of the freestream Mach and Reynolds numbers, the viscous boundary layer thickness is estimated as a parabolic function of X from existing laminar boundary layer solutions. The upper boundary of the flow region z=zmax (x) is placed at a distance of FN boundary layer thicknesses away from the plate in the z direction, where FN is an input constant. The image of this upper boundary in the computational space is the surface L=LMAX. The grid points are equally spaced in the direction along the plate between XZERO and XMAX. At each x station, the grid points are distributed exponentially as a function of z to provide a fine grid near the surface of the plate and a coarse grid outside the viscous layer. The exponential is tailored to place half the grid points inside the viscous layer and half between the boundary layer edge and the upper computational boundary z=zmax(x). The grid points are equally spaced in the y coordinate direction. These calculations are performed in subroutine NDLPTS.

The initial conditions on the flow variables at grid points are computed in subroutine INITQ. Pressure is taken as uniform and equal to its freestream value. Velocity is determined from the Blasius boundary solution for incompressible flow. Temperature is computed from the velocity through the Crocco relation, and density follows from the equation of state.

3.3.2 Input Data and Output

Card images of the input data for this test case are given in Fig. 3-1. The first page of printed output is displayed in Fig. 3-2 and merely reproduces the input data. A printout of the grid and initial flowfield also is given when the input option IWRIT=1 is selected. This output is not shown here because it is identical to the initial flowfield output given by the NOZL3D code under the option IWRIT=1. The latter output for the test case is reproduced in Appendix D.

3.4 TEST CASE NO. 2: TWO-DIMENSIONAL INTERNAL FLOW

Test case No. 2 is for a so-called "two-dimensional" nozzle that has straight sidewalls and a rectangular cross section of constant width. For this test case, only the two dimensional flow in the vertical plane of symmetry of the nozzle is considered. The nozzle configuration and operating conditions already have been described in Section 2.2.2.

```
  200   15    1   15    1    0    0    1    1    1    0    0    0    0    3
    1    1   15    0    0    2    0    0    0   50    1    1    1    0    0   50
0.01       3.0       3.0       100000.0  1.0       300.0      1.0       1.0
1.4        1.0       0.0       0.0       1.1       0.0        0.1       0.0
0
0.01       1.0       20.       1.0
```

Input Data Card Images - Test Case No. 1 - NOZLIC
FIG. 3-1

```
 NMAX   JMAX   KMAX   LMAX   LAMIN  INVISC  J1BC  JMAXBC  KPLANE  K1BC  JKIWL  JKIWU  KW   JKW  KMAXBC
 200     15     1      15     1      0       0     1       1       1     0      0      0    0    3

 L1BC   JLIWL  JLIWU  LW     JLW    LMAXBC  NRST  IWRIT   NGRI    NP    KVIS   LVIS   KLVIS  INFLT  ISUTH  NROUT
  1      1      15     0      0      2       0     0       0       50    1      1      1      0      0      50

     DT            FSMACH          RMACH           RE              PR              RTDEGK          FSP             FST
 1.0000000-02   3.0000000+00   3.0000000+00   1.0000000+05   1.0000000+00   3.0000000+02   1.0000000+00   1.0000000+00

   GAMMA          RMUEXP          TW              CNBR            DTFAC           RM              SMU             OMEGA
 1.4000000+00   1.0000000+00    .0000000        .0000000      1.1000000+00     .0000000      1.0000000-01     .0000000


 NOPT  JREADX  IGEOM  KREADY  IRGRID  ICRUDE  ITOT  INWALL
  0      0      0      0       0       0       0     0

   XZERO          XMAX            FN              YMAX
 1.0000000-02   1.0000000+00   2.0000000+01   1.0000000+00
NOZZLE THROAT AT JT=   1
```

Output Page for Test Case No. 1 - NOZLIC

FIG. 3-2

3.4.1 Description of Grid and Initial Conditions

The nozzle is bilaterally symmetric. The x axis of the Cartesian base coordinate system coincides with the intersection of the vertical and horizontal symmetry planes. The latter planes coincide with the Cartesian planes y=0 and z=0, respectively, and the origin of the coordinate system is positioned at the geometric center of the throat. The test case considers the flow in the upper part of the vertical symmetry plane y=0, $z \geq 0$ between an upstream inflow boundary and the outflow boundary, which coincides with the nozzle exit plane. The described region interior to the nozzle is covered by a 23x15 grid in the x(j) and z(l) directions, respectively. The streamwise (x) grid is nonuniform with a relatively fine spacing near the throat. The vertical (z) grid is stretched exponentially to resolve the wall boundary layer. Along each vertical grid line, half the grid points lie in the region $0.99 \leq z/zmax(x) \leq 1$. The physical coordinates of the x(j) grid are read in (JREADX=23). A function specifying the nozzle wall shape in dimensional units (inches) is contained in subroutine GEOM (IGEOM=1 option). Before the final grid is constructed by subroutine NDLPTS, all inputted dimensions, including the nozzle wall shape function,are automatically normalized by the throat half-height. The code assumes the throat always to be located at the position x=0. The nozzle wall height zmax(x=0) at this position thus forms the reference length by which all dimensions are normalized in both the NOZLIC code run and the subsequent NOZL3D code run. Note that a similar normalization of dimensions is employed for all nozzle configurations, regardless of the option NOPT=1,2, or 3. For general three-dimensional nozzle configurations, the reference length always is selected as the z foordinate of the internal surface of the nozzle wall at the position x=0, y=0.

The initial flowfield conditions are computed in subroutine INITQ as follows. The nozzle is assumed to be choked at the throat. The pressure, density, temperature, and streamwise velocity (averaged over the cross section) are computed from one-dimensional inviscid isentropic flow theory for the nozzle area variation. These inviscid core flow conditions are applied over the lower half of the grid $0 \leq L \leq LMAX/2$, assuming that the streamlines are parallel to the grid lines L=constant. The velocity components at the nozzle wall L=LMAX are set to zero to satisfy the no-slip viscous wall boundary conditions. The velocity components at the remaining grid points are linearly interpolated in L between LMAX/2 and LMAX. The Crocco relation is used to compute temperature from velocity in this region. Density follows from the equation of state by taking the pressure as uniform over the nozzle cross section at each x station.

The inflow boundary conditions on total pressure, total temperature, and on the ratios of the transverse velocity components to the streamwise component are simply computed from the described initial flow conditions at the inflow plane J=1.

3.4.2 Input Data and Output

Card images of the input data for this test case are given in Fig. 3-3. The first page of printed output is displayed in Fig. 3-4 and merely reproduces the input data. A printout of the grid and initial flowfield also is given when the input option IWRIT=1 is selected. This output is not shown here because it is identical to the initial flowfield output given by the NOZL3D code under the option IWRIT=1. The latter output for the test case is reproduced in Appendix D.

```
    0   23    1   15    1    0    0    1    1    1    0    0    0    0    3
    1    0    0    0    0    1    0    1    0   50    1    1    1    0    1  100
0.05       1.0       1.0            9.4E5 0.72      295.       1.0       1.0
1.4        1.0       0.0       0.0       1.0       0.0       0.05      .00
    1   23    2    0    0    0    0    0
-4.        2.275     .99       2.0
-4.        -3.4      -2.8      -2.275    -1.8      -1.3      -1.0      -.75
-.6        -.475     -.35      -.225     -.1       0.0       .075      .175
.325       .65       .975      1.275     1.675     2.025     2.275
```

Input Data Card Images - Test Case No. 2 - NOZLIC
FIG. 3-3

NMAX	JMAX	KMAX	LMAX	LAMIN	INVISC	J1BC	JMAXBC	KPLANE	K1BC	JK1WL	JK1WU	KW	JKW	KMAXBC
0	23	1	15	1	0	0	1	1	1	0	0	0	0	3

L1BC	JL1WL	JL1WU	LW	JLW	LMAXBC	NRST	IWRIT	NGRI	NP	KVIS	LVIS	KLVIS	INFLT	ISUTH	NROUT
1	0	0	0	0	1	0	1	0	50	1	1	1	0	1	100

DT	FSMACH	RMACH	RE	PR	RTDEGK	FSP	FST
5.0000000-02	1.0000000+00	1.0000000+00	9.4000000+05	7.2000000-01	2.9500000+02	1.0000000+00	1.0000000+00

GAMMA	RMUEXP	TW	CNBR	DTFAC	RM	SMU	OMEGA
1.4000000+00	1.0000000+00	.0000000	.0000000	1.0000000+00	.0000000	5.0000000-02	.0000000

NOPT	JREADX	IGEOM	KREADY	IRGRID	ICRUDE	ITOT	INWALL
1	23	2	0	0	0	0	0

XZERO	XMAX	FN	YMAX
-4.0000000+00	2.2750000+00	9.9000000-01	2.0000000+00

```
X(J)=   -4.00000  -3.40000  -2.80000  -2.27500  -1.80000  -1.30000  -1.00000   -.75000
 -.60000   -.47500   -.35000   -.22500   -.10000    .00000    .07500    .17500
  .32500    .65000    .97500   1.27500   1.67500   2.02500   2.27500
NOZZLE THROAT AT JT=  14
```

Output Page for Test Case No. 2 - NOZZLIC
FIG. 3-4

3.5 TEST CASE NO. 3: THREE-DIMENSIONAL INTERNAL FLOW

Test Case No. 3 is a three-dimensional flow computation for the same nozzle configuration dealt with in the two-dimensional flow computation of Test Case No. 2. The nozzle operating conditions are identical to those for Case No. 2.

3.5.1 Description of Grid and Initial Conditions

The vertical (z) and streamwise (x) grid is the same as for the 2-D flow computation of Test Case No. 2. For the 3-D case, 10 grid points are distributed in the y direction between the vertical symmetry plane y=0 and the nozzle sidewall with an exponential stretching to resolve the sidewall boundary layer. The first three of these grid point locations are read in (KREADY=3). The remainder of the y grid is computed automatically as described under the input item KREADY in Section 3.1. The dimensions are normalized by a reference length (the throat half -height) as described in Section 3.4.1.

The flowfield initial conditions and the inflow boundary conditions are computed by subroutine INITQ in the same general fashion as outlined in Section 3.4.1 for Test Case No. 2.

3.5.2 Input Data and Output

Card images of the input data for this test case are given in Fig. 3-5. The first page of printed output is displayed in Fig. 3-6 and merely reproduces the input data. A printout of the grid and initial flowfield also is given when the input option IWRIT=1 is selected. This output is not shown here because it is identical to the initial flowfield output given by the NOZL3D code under the option IWRIT=1. The latter output for the test case is reproduced in Appendix D.

3.6 TEST CASE NO. 4: INTERNAL AND EXTERNAL FLOW FOR AN AXISYMMETRIC NOZZLE

The nozzle configuration and operating conditions already have been described in Section 2.2.4, which deals with the NOZL3D code running instructions for this test case .

3.6.1 Description of Grid and Initial Conditions

The x axis of the Cartesian coordinate system is chosen to coincide with the axis of symmetry of the nozzle. The flowfield region for the computation occupies the region between inflow and outflow planes normal to the axis, between the vertical and horizontal symmetry planes y=0 and z=0, and inside a cylindrical outer "freestream" boundary that is concentric with the nozzle. That is, the flow region occupies only a portion of the quarter-space $y \geq 0$, $z \geq 0$.

The grid consists of KMAX=5 meridional planes equally spaced at intervals of 22.5 degrees, JMAX=28 cross-sectional planes along the x direction, of which the last five are downstream of the nozzle exit (JLW=23), LW=15 grid points exponentially distributed across the interior of the nozzle in the radial direction, and another 13 points exponentially distributed in the radial direction between the outer nozzle wall and the lateral outer computational boundary (LMAX=28). The nonuniform axial grid x(j) is read in (JREADX = 28). The equally- spaced meridional grid is constructed automatically by the code under the option NOPT=2. The meridional plane K=1 coincides with the Cartesian coordinate plane y=0. The x-z grid is constructed first in this plane and then rotated to obtain the grid in each of the remaining planes.

```
    0   23   10   15    1    0    0    1    0    1    0    0    0    0    1
    1    0    0    0    0    1    0    1    0   25    1    1    1    0    1  100
0.01       1.0        1.0        940000.0  .72        295.       1.0        1.0
1.4        1.0        0.0        0.0       1.1        0.0        .05        0.01
    1   23    2    3
-4.        2.275      .99        2.0
-4.        -3.4       -2.8       -2.275    -1.8       -1.3       -1.0       -.75
-.6        -.475      -.35       -.225     -.1        0.0        .075       .175
.325       .65        .975       1.275     1.675      2.025      2.275
0.         .9         1.749
```

Input Data Card Images - Test Case No. 3 - NOZLIC
FIG. 3-5

NMAX	JMAX	KMAX	LMAX	LAMIN	INVISC	J1BC	JMAXBC	KPLANE	K1BC	JK1WL	JK1WU	KW	JKW	KMAXBC
0	23	10	15	1	0	0	1	0	1	0	0	0	0	1

L1BC	JL1WL	JL1WU	LW	JLW	LMAXBC	NRST	IWRIT	NGRI	NP	KVIS	LVIS	KLVIS	INFLT	ISUTH	NROUT
1	0	0	0	0	1	0	1	0	25	1	1	1	0	1	100

DT	FSMACH	RMACH	RE	PR	RTDEGK	FSP	FST
1.0000000-02	1.0000000+00	1.0000000+00	9.4000000+05	7.2000000-01	2.9500000+02	1.0000000+00	1.0000000+00

GAMMA	RMUEXP	TW	CNBR	DTFAC	RM	SMU	OMEGA
1.4000000+00	1.0000000+00	.0000000	.0000000	1.1000000+00	.0000000	5.0000000-02	1.0000000-02

NOPT	JREADX	IGEOM	KREADY	IRGRID	ICRUDE	ITOT	INWALL
1	23	2	3	0	0	0	0

XZERO	XMAX	FN	YMAX
-4.0000000+00	2.2750000+00	9.9000000-01	2.0000000+00

```
X(J)=    -4.00000  -3.40000  -2.80000  -2.27500  -1.80000  -1.30000  -1.00000   -.75000
  -.60000   -.47500   -.35000   -.22500   -.10000    .00000    .07500    .17500
   .32500    .65000    .97500   1.27500   1.67500   2.02500   2.27500
Y(K)=      .00000    .90000   1.74900
NOZZLE THROAT AT JT=  14
```

Output Page for Test Case No. 3 - NOZLIC
FIG. 3-6

The grid is constructed by subroutine NDLPTS, using information about the nozzle geometry that is contained in three function subroutines: RWFUNC(X), RWOUT(X), and RMAX(X). The latter specify, respectively, the radii of the interior and exterior surfaces of the nozzle wall and the radius of the lateral outer "freestream" computational boundary, all as functions of the axial coordinate x. Note that RMAX(X) is a constant for the present test case. As mentioned earlier, the axial grid is read in. The radial grid i.e., the z-grid for the meridional plane K=1 under discussion, is stretched exponentially with separate stretching functions in the interior of the nozzle and in the exterior flow region. Within each of these regions, the exponential is tailored to place half the grid points allotted to the region within a specified distance of the wall. For each region, the latter distance, which may vary with axial position, x, is specified by a function subroutine: DELT(X) for the nozzle interior, and DELOUT(X) for the exterior flow region. These function subroutines, as well as those described earlier that specify the nozzle wall and freestream boundary geometries, can be reprogrammed easily for other nozzle configurations.

The inflow boundary conditions on total pressure, total temperature, and radial to axial velocity component ratio are not read in as input data for this particular test case. Rather, they are computed in a special subroutine, INFLOW, which is called from subroutine INITQ. The latter computes initial conditions for the flow region inside the nozzle in the same general way as for the internal flows dealt with in test cases 2 and 3. This defines the flow variables in the region $L \leq LW$, $J \leq JLW$. For the corresponding region downstream of the nozzle exit, $J \geq JLW$, $L \leq LW$, the exit plane conditions are used at each J. Outside the nozzle, the transverse velocity components v,w are set to zero, the static pressure and total temperature are set equal to their freestream values, and the total pressure at the inflow plane is computed from a formula given in subroutine INFLOW.

The initial flow variables at points of the external flow region that lie downstream of the inflow plane are obtained as follows. Along each streamwise mesh line K,L=const., the total pressure is assumed constant and equal to its value at the inflow plane. The velocity , u, and static temperature T then are computed from the known total pressure, total temperature, and static pressure. The initial conditions at stations x=const. downstream of the nozzle exit plane simply are set equal to those at the exit plane itself.

3.6.2 Input Data and Output

Card images of the input data for this test case are given in Fig. 3-7. The first page of printed output is displayed in Fig. 3-8 and merely reproduces the input data. A printout of the grid and initial flowfield also is given when the input option IWRIT=1 is selected. This output is not shown here because it is identical to the initial flowfield output given by the NOZL3D code under the option IWRIT=1. The latter output for the test case is reproduced in Appendix D.

```
    0   28    5   28    0    0    0    1    0    1    0    0    0    0    4
    1    0    0   15   23    2    0    1    0   50    0    1    0    0    1  100
.05       .8        1.0             1.1E6 .72      300.       .5        .98
1.4       1.        0.         0.        1.1        0.        .5        .05
    2   28    0    0    0    1    0    0
-34.5      14.5      0.        0.
-34.5      -29.5     -24.5     -19.5     -15.5     -12.5     -10.1     -8.4
-7.        -5.842    -4.953    -4.064    -3.048    -2.032    -1.016    0.
1.08       2.17      3.26      4.35      5.44      6.53      7.62      8.7
10.        11.5      13.       14.5
```

Input Data Card Images - Test Case No. 4 - NOZLIC
FIG. 3-7

```
 NMAX    JMAX    KMAX    LMAX    LAMIN   INVISC  JIBC    JMAXBC  KPLANE  KIBC    JK1WL   JK1WU   KW      JKW     KMAXBC
   0      28       5      28       0       0       0       1       0       1       0       0       0       0       4

 LIBC    JL1WL   JL1WU   LW      JLW     LMAXBC  NRST    IWRIT   NGRI    NP      KVIS    LVIS    KLVIS   INFLT   ISUTH   NROUT
   1       0       0      15      23       2       0       1       0      50       0       1       0       0       1     100

    DT              FSMACH          RMACH           RE              PR              RTDEGK          FSP             FST
 5.0000000-02    8.0000000-01    1.0000000+00    1.1000000+06    7.2000000-01    3.0000000+02    5.0000000-01    9.8000000-01

   GAMMA           RMUEXP          TW              CNBR            DTFAC           RM              SMU             OMEGA
 1.4000000+00    1.0000000+00     .0000000        .0000000        1.1000000+00     .0000000        5.0000000-01    5.0000000-02


  NOPT   JREADX   IGEOM   KREADY   IRGRID   ICRUDE     ITOT   INWALL
    2      28       0        0        0        1        0       0

   XZERO           XMAX            FN              YMAX
-3.4500000+01    1.4500000+01     .0000000        .0000000

X(J)=  -34.50000 -29.50000 -24.50000 -19.50000 -15.50000 -12.50000 -10.10000  -8.40000
 -7.00000  -5.84200  -4.95300  -4.06400  -3.04800  -2.03200  -1.01600    .00000
  1.08000   2.17000   3.26000   4.35000   5.44000   6.53000   7.62000   8.70000
 10.00000  11.50000  13.00000  14.50000
 NOZZLE THROAT AT JT=  16
L,RI,PTI,HTI,VROUI= ,  1   .00000      1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= ,  2  2.63610+00   1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= ,  3  4.19240+00   1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= ,  4  5.11122+00   1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= ,  5  5.65368+00   1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= ,  6  5.97393+00   1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= ,  7  6.16301+00   1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= ,  8  6.27463+00   1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= ,  9  6.34054+00   1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= , 10  6.37944+00   1.00000+00  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= , 11  6.40241+00   9.95461-01  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= , 12  6.41598+00   9.91034-01  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= , 13  6.42398+00   9.86841-01  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= , 14  6.42871+00   9.82375-01  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= , 15  6.43150+00   9.68890-01  1.00000+00   .00000
L,RI,PTI,HTI,VROUI= , 16  7.62000+00   5.02094-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 17  7.62012+00   5.15349-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 18  7.62042+00   5.22160-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 19  7.62118+00   5.30015-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 20  7.62308+00   5.39975-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 21  7.62785+00   5.53055-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 22  7.63983+00   5.70564-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 23  7.66992+00   5.94359-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 24  7.74552+00   6.27224-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 25  7.93540+00   6.73547-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 26  8.41238+00   7.40606-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 27  9.61049+00   7.62170-01  1.10544+00   .00000
L,RI,PTI,HTI,VROUI= , 28  1.26200+01   7.62170-01  1.10544+00   .00000
```

Output Page for Test Case No. 4 - NOZLIC
FIG. 3-8

Section 4
REFERENCES

1. Thomas, P.D., "Numerical Method for Predicting Flow Characteristics and Performance of Nonaxisymmetric Nozzles - Theory," Conractor's Report NASA CR 3147, prepared by the Lockheed Palo Alto Research Laboratory, Palo Alto, Calif., for the NASA Langley Research Center, Hampton, Va, September, 1979.

2. Felippa, C. A., "The Input/Output Manager DMGASP and the Direct-Access Library Manager EZ-DAL of the NOSTRA Data Management System," LMSC-D626839 , Lockheed Palo Alto Research Laboratory, Palo Alto, Calif., July, 1978.

3. Thomas, P.D., "Numerical Method for Predicting Flow Characteristics and Performance of Nonaxisymmetric Nozzles, Part 2 - Applications," NASA CR-3264, 1980.

APPENDIX A

LISTING OF THE NOZL3D PROGRAM

```
          NOZL3D - COMDECKS
 1  *COMDECK BASE
 2        COMMON/BASE/NMAX,JMAX,KMAX,LMAX,JM,KM,LM,DT,GAMMA,GAMI,SMU,FSMACH
 3       1  ,DX1,DY1,DZ1,ND,ND2,FV(5),FD(5),HD,ALP,GD,OMEGA,HDX,HDY,HDZ
 4       2,RM,CNBR,PI,ITR,INVISC,LAMIN,NP,INT1,INT2,INT3
 5       3,KPLANE,ITW,TW,WMDOT,LIBC,LMAXBC,LU,LL,JWL1,KU,WTFAC,JMAXBC
 6       4,J1BC,JB,HTOT(32,32),PTOT(32,32),VOU(32,32),WOU(32,32),KMAXBC,KAL,
 7       5K1BC,DTFAC,RESID,NK,AREF,LW,KW,JL1WL,JL1WU,JK1WL,JK1WU,JLW,JKW
 8       6,SM0,XLSKM2,XLS22,ZLSKM2,ZLS22,ENTGD(32),ENTGD1(32,5),SIGJMX,JTJ,
 9       7KTJ,LTJ,IGNCAL,NRES,NC,NC1,TAU,NSTEP,JT,KT,LT,SIGMAX,GF(5),RESIDS
10       8,NKLP,NLROW,NLSKIP,KL2,INXBC,RMACH,DTMAX,KVIS,LVIS,KLVIS
11        COMMON/GEO/NB1,NB2,RFRONT,RMAX,XR,XMAX,DRAD,DXC
12        COMMON/READ/NRST,IWRIT,NGRI,NROUT
13        COMMON/VIS/RE,PR
14 *COMDECK BTRID
15        COMMON/BTRID/A(32,5,5),B(32,5,5),C(32,5,5),D(32,5,5),F(32,5)
16 *COMDECK GLOB
17        COMMON/GLOB/CWFAC,CW,JTT,AT,DINJMX(5),DINJ1(5),ENTB(32,5,2)
18       1    ,Q6L1,Q6LMAX,IGFSUR,ENTD(32)
19 *COMDECK RHSBCC
20        COMMON/RHSBCC/IW,KUORLU,LORKMX,KORLMX,LMORKM,LLORKL,LUORKU,LKMXBC
21       1,KLMXBC,LK1BC,KL1BC,LORKW,KORLW,JLK1WL,JLK1WU,JKL1WL,JKL1WU,JLKW
22       1,JKLW,DZORDY,GKPR,PRTR,I,J,KLORLL
23 *COMDECK SHOCKC
24        COMMON/SHOCKC/XST(32,32),YST(32,32),ZST(32,32),ZET(32,32),
25       1  QS(32,32),SHKWT
26 *COMDECK VARS1
27        COMMON/VARS/Q(32,16,32),Q6(32,32),X(32),XX(32,4),YY(32,4)
28       1,ZZ(32,4)
29 *COMDECK VARS2
30        DIMENSION TURMU(32,16,32),Y(32,16,32),Z(32,16,32),S(32,16,32),
31       1XXI(32,16,32),YXI(32,16,32),ZXI(32,16,32),DXIDX(32,16,32),
32       2DXIDY(32,16,32),DXIDZ(32,16,32)
33        EQUIVALENCE (Q,TURMU,Y,Z,S,XXI,YXI,ZXI,DXIDX,DXIDY,DXIDZ)
34 C
35 C      THE Q ARRAY IS USED AS FOLLOWS, WHERE JK IS EITHER J OR K:
36 C
37 C            Q(L, 1,JK)   Q(L, 1,JK)                    RHO
38 C            Q(L, 2,JK)   Q(L, 2,JK)                    RHO*U
39 C            Q(L, 3,JK)   Q(L, 3,JK)                    RHO*V
40 C            Q(L, 4,JK)   Q(L, 4,JK)                    RHO*W
41 C            Q(L, 5,JK)   Q(L, 5,JK)                    E
42 C            Q(L, 6,JK)TURMU(L, 6,JK)                   TURMU
43 C            Q(L, 7,JK)   Y(L, 7,JK)                    Y
44 C            Q(L, 8,JK)   Z(L, 8,JK)                    Z
45 C            Q(L, 9,JK)   S(L, 9,JK)                    S1
46 C            Q(L,10,JK)   S(L,10,JK)                    S2
47 C            Q(L,11,JK)   S(L,11,JK)                    S3
48 C            Q(L,12,JK)   S(L,12,JK)                    S4
49 C            Q(L,13,JK)   S(L,13,JK)                    S5
50 C            Q(L,14,JK) XXI(L,14,JK) OR DXIDX(L,14,JK)  DXDXI OR DXIDX
51 C            Q(L,15,JK) YXI(L,15,JK) OR DXIDY(L,15,JK)  DYDXI OR DXIDY
52 C            Q(L,16,JK) ZXI(L,16,JK) OR DXIDZ(L,16,JK)  DZDXI OF DXIDZ
53 C
54 C      THE JACOBIAN IS STORED IN Q(L,14,J) FOR CONSTANT K
55 C        AND IN Q(L,15,K) FOR CONSTANT J.
56 C        WITHIN SWEEPS IT IS REFERENCED BY Q6(L,JK).
57 C
58 *COMDECK VISC
59        COMMON/VISC/S0(32),S1(32),S2(32),S3(32),S4(32),S5(32),S6(32),U(32)
60       1  ,V(32),W(32),E(32),RR(32),DEU(32,5,5)
61 *COMDECK VISCO
62        COMMON/VISCO/RMUEXP,ISUTH,TSUTH
```

```
1   *DECK AMATRX
2         SUBROUTINE AMATRX(A,JK,L,R1,R2,R3,R4)
3   *CALL BASE
4   *CALL VARS1
5   *CALL VARS2
6         DIMENSION A(5,5)
7         GAM2 = 2.-GAMMA
8         RR = 1./Q(L,1,JK)
9         U = Q(L,2,JK)*RR
10        V = Q(L,3,JK)*RR
11        W = Q(L,4,JK)*RR
12        UU = U*R1+V*R2+W*R3
13        UT = U**2+V**2+W**2
14        C1 = GAMI*UT*.5
15        C2 = Q(L,5,JK)*RR*GAMMA
16        A(1,1) = R4
17        A(1,2) = R1
18        A(1,3) = R2
19        A(1,4) = R3
20        A(1,5) = 0.
21        A(2,1) = R1*C1-U*UU
22        A(2,2) = R4+UU+R1*GAM2*U
23        A(2,3) = -R1*GAMI*V+R2*U
24        A(2,4) = -R1*GAMI*W+R3*U
25        A(2,5) = R1*GAMI
26        A(3,1) = R2*C1-V*UU
27        A(3,2) = R1*V-R2*GAMI*U
28        A(3,3) = R4+UU+R2*GAM2*V
29        A(3,4) = -R2*GAMI*W+R3*V
30        A(3,5) = R2*GAMI
31        A(4,1) = R3*C1-W*UU
32        A(4,2) = R1*W-R3*GAMI*U
33        A(4,3) = R2*W-R3*GAMI*V
34        A(4,4) = R4+UU+R3*GAM2*W
35        A(4,5) = R3*GAMI
36        A(5,1) = (-C2+2.*C1)*UU
37        A(5,2) = R1*(C2-C1)-GAMI*U*UU
38        A(5,3) = R2*(C2-C1)-GAMI*V*UU
39        A(5,4) = R3*(C2-C1)-GAMI*W*UU
40        A(5,5) = R4+GAMMA*UU
41        RETURN
42        END
```

```
      *DECK BC
            SUBROUTINE BC(J)
      *CALL BASE
      *CALL VARS1
      *CALL SHOCKC
            COMMON/AXISYM/LAXIS
      *CALL VARS2
            P(IL,IK)=GD*(Q(IL,5,IK)-.5*(Q(IL,2,IK)**2+Q(IL,3,IK)**2
           1   +Q(IL,4,IK)**2)/Q(IL,1,IK))
            EAVG(ILL,IKL,ILB,IKB)=.5*(Q(ILL,5,IKL)+Q(ILB,5,IKB))
            EORAVG(ILL,IKL,ILB,IKB)=.5*(Q(ILL,5,IKL)/Q(ILL,1,IKL)+Q(ILB,5,IKB)
           1  /Q(ILB,1,IKB))
            J=JJ
      C     ELIMINATE ROUNDOFF ERROR IN TRANSVERSE VELOCITY V FOR PLANE FLOW
      C     IN THE XZ PLANE (PLANE=1) AND ENFORCE PLANAR SYMMETRY
            IF(KMAX.EQ.1) GO TO 95
            IF(KPLANE.EQ.0) GO TO 95
            DO 90 L=1,LMAX
            DO 90 K=2,KMAX
            DO 85 N=1,5
         85 Q(L,N,K)=Q(L,N,1)
            Q(L,3,K)=0.
         90 CONTINUE
         95 CONTINUE
      C     LAGGED B.C. FOR INTERNAL CORNERS AND SINGULARITIES
      C     INTERNAL CORNER AT KMAX,LMAX
            IF(KPLANE.EQ.1) GO TO 100
            IF(KMAXBC.NE.1 .OR. LMAXBC.NE.1) GO TO 100
            IF(J.LT.JB) GO TO 1000
            LLL=LMAX
            KLL=KMAX-1
            LLB=LMAX-1
            KLB=KMAX
            L=LMAX
            K=KMAX
            Q(L,5,K)=EAVG(LLL,KLL,LLB,KLB)
            Q(L,1,K)=Q(L,5,K)/EORAVG(LLL,KLL,LLB,KLB)
        100 CONTINUE
            IF(NC.EQ.0) GO TO 1000
      C     ELIMINATE ANY OUTFLOW OF COMPUTED INFLOW PLANE J=1
      C     IF(J.NE.1) GO TO 600
      C     IF(J1BC.NE.1) GO TO 600
      C     DO 500 L=LL,LU
      C     DO 500 K=KAL,KU
      C     IF(Q(L,2,K).GE.0) GO TO 500
      C     Q(L,2,K)=0.
      C     Q(L,3,K)=0.
      C     Q(L,4,K)=0.
      C     Q(L,5,K)=PTOT(L,K)/GD
      C     Q(L,1,K)=PTOT(L,K)/HTOT(L,K)
      C 500 CONTINUE
        600 CONTINUE
      C     B.C. AT SINGULAR AXIS L=1 FOR AXISYMMETRIC FLOW
            IF(ABS(Y(1,7,KMAX)-Y(1,7,1)).GT.1.E-6 .OR. KPLANE.EQ.1) GO TO 1000
      C     SET V=W=0 AND EXTRAPOLATE U,RHO,T QUADRATICALLY WITH ZERO NORMAL
      C     GRADIENT AT AXIS
            IF(J.LT.JB) GO TO 1000
            RHO=0.
            U=0.
            TEM=0.
            DO 900 K=1,KMAX
            RHO1=Q(2,1,K)
            RHO2=Q(3,1,K)
            U1=Q(2,2,K)/RHO1
            U2=Q(3,2,K)/RHO2
            V1=Q(2,3,K)/RHO1
            V2=Q(3,3,K)/RHO2
            W1=Q(2,4,K)/RHO1
            W2=Q(3,4,K)/RHO2
            T1=GD*(Q(2,5,K)/RHO1-.5*(U1**2+V1**2+W1**2))
            T2=GD*(Q(3,5,K)/RHO2-.5*(U2**2+V2**2+W2**2))
            RHO=RHO+4.*RHO1-RHO2
            U=U+4.*U1-U2
        900 TEM=TEM+4.*T1-T2
            U=U/(3.*KMAX)
            RHO=RHO/(3.*KMAX)
            TEM=TEM/(3.*KMAX)
            IF(J.NE.1) GO TO 920
            IF(J1BC.EQ.0) GO TO 920
            TEM=HTOT(1,1)*(RHO*HTOT(1,1)/PTOT(1,1))**GAM1
            U=SQRT(2.*(HTOT(1,1)-TEM)/GAM1)
        920 CONTINUE
            DO 940 K=1,KMAX
            Q(1,1,K)=RHO
            Q(1,2,K)=RHO*U
            Q(1,3,K)=0.
```

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                NOZL3D - BC
      Q(1,4,K)=0.
  940 Q(1,5,K)=RHO*(TEM/GD+.5*U**2)
C     ELIMINATE ROUNDOFF ERROR FOR AXISYMMETRIC FLOW
      PI2=2.*ATAN(1.)
      PIP=PI2/(KMAX-1.)
      DO 950 L=1,LMAX
      DO 945 K=2,KMAX
      THET=(K-1)*PIP
      Q(L,1,K)=Q(L,1,1)
      Q(L,2,K)=Q(L,2,1)
      Q(L,5,K)=Q(L,5,1)
      Q(L,3,K)=Q(L,4,1)*SIN(THET)
  945 Q(L,4,K)=Q(L,4,1)*COS(THET)
      Q(L,4,KMAX)=0.
  950 CONTINUE
 1000 CONTINUE
C     LAGGED B.C. FOR SINGULAR CORNERS AND EDGES
C     AXIAL INTERSECTION OF VERTICAL AND HORIZONTAL WALLS IN PLANES
C     L=1 AND K=1
      IF(JL1WU.LE.0 .OR. JK1WU.LE.0) GO TO 150
      J1= MAX0(JL1WL,JK1WL)
      J2=MIN0(JL1WU,JK1WU)
      IF(J.LT.J1.OR.J.GT.J2) GO TO 150
      LLL=1
      KLL=2
      LLB=2
      KLB=1
      Q(1,5,1)=EAVG(LLL,KLL,LLB,KLB)
      Q(1,1,1)=Q(1,5,1)/EORAVG(LLL,KLL,LLB,KLB)
C     CORNERS AND EDGES OF INTERMEDIATE WALLS
  150 IF(KW.LE.0 .AND. LW.LE.0) GO TO 185
      IF(KW.GT.0 .AND. LW.GT.0) GO TO 170
C     TRAILING EDGE OF LONE INTERNAL WALL THAT SPANS ENTIRE WIDTH OF
C     COMPUTATIONAL DOMAIN
      DO 165 IW=1,2
      CALL SW
      IF(LORKW.LE.0) GO TO 165
      IF(J.NE.JLKW) GO TO 165
      I1=0
      LORK=LORKW
      L1=-1
      K1=0
      IF(IW.EQ.2) L1=0
      IF(IW.EQ.2) K1=-1
  155 DO 160 K=KLORLL,KUORLU
      LLL=LORK
      KKK=K
      IF(IW.EQ.2) LLL=K
      IF(IW.EQ.2) KKK=LORK
      Q(LLL,1,KKK)=Q(LLL+L1,1,KKK+K1)
  160 Q(LLL,5,KKK)=P(LLL+L1,KKK+K1)/GD
      IF(I1.EQ.1) GO TO 165
      I1=1
      LORK=LORKW+1
      L1=-L1
      K1=-K1
      GO TO 155
  165 CONTINUE
      GO TO 255
C     CORNERS AND EDGES OF BOTH INTERMEDIATE WALLS
  170 CONTINUE
C     AXIAL INTERSECTIONS OF THE TWO WALLS
      J2=MIN0(JKW,JLW)
      IF(J.GT.J2) GO TO 185
C     INTERNAL CORNER
      K=KW
      L=LW
      I1=0
  175 IF(J.NE.1)  GO TO 177
      IF(NC.EQ.NRST) GO TO 185
      Q(L,5,K)=PTOT(L,K)/GD
      Q(L,1,K)=PTOT(L,K)/HTOT(L,K)
      IF(I1.EQ.1) GO TO 185
      GO TO 180
  177 LLL=L
      KLL=K-1
      LLB=L-1
      KLB=K
      Q(L,5,K)=EAVG(LLL,KLL,LLB,KLB)
      Q(L,1,K)=Q(L,5,K)/EORAVG(LLL,KLL,LLB,KLB)
      IF(I1.EQ.1) GO TO 185
C     EXTERNAL CORNER
  180 I1=1
      K=KW+1
      L=LW+1
      GO TO 175
  185 DO 250 IW=1,2
```

```
      CALL SW
C     INTERSECTION OF PLUG AT LORK=1 WITH SIDEPLATE AT KORL=KORLW OR KORLMX
      IF(JLK1WU.LE.0) GO TO 200
      IF(J.LT.JLK1WL.OR.J.GT.JLK1WU) GO TO 200
      LORK=1
      IF(KORLW.EQ.0) KORL=KORLMX
      IF(KORL.EQ.1) GO TO 200
      IF(KORLW.NE.0) KORL=KORLW
      IF(IW.EQ.2) GO TO 187
      L=LORK
      K=KORL
      LLL=L+1
      KLL=K
      LLB=L
      KLB=K-1
      GO TO 190
  187 L=KORL
      K=LORK
      LLL=L
      KLL=K+1
      LLB=L-1
      KLB=K
  190 Q(L,5,K)=EAVG(LLL,KLL,LLB,KLB)
      Q(L,1,K)=Q(L,5,K)/EORAVG(LLL,KLL,LLB,KLB)
C     TRAILING EDGES OF WALL AT J=JLKW
  200 IF(J.NE.JLKW) GO TO 215
      K2=KORLW-1
      LORK=LORKW
      I1=0
      L1=-1
      K1=0
      IF(IW.EQ.2) L1=0
      IF(IW.EQ.2) K1=-1
  205 DO 210 KORL=KLORLL,K2
      L=LORK
      K=KORL
      IF(IW.EQ.2) L=KORL
      IF(IW.EQ.2) K=LORK
      Q(L,1,K)=Q(L+L1,1,K+K1)
  210 Q(L,5,K)=P(L+L1,K+K1)/GD
      IF(I1.EQ.1) GO TO 215
      I1=1
      LORK=LORKW+1
      L1=-L1
      K1=-K1
      GO TO 205
  215 IF(JKLW-JLKW) 250,220,230
C     CORNER POINTS AT MUTUAL TRAILING EDGE OF THE TWO WALLS
  220 IF(J.NE.JKLW) GO TO 250
      LORK=LORKW
      KORL=KORLW
      I1=0
      L1=-1
      K1=-1
  225 K=KORL
      L=LORK
      IF(IW.EQ.2) K=LORK
      IF(IW.EQ.2) L=KORL
      Q(L,1,K)=Q(L+L1,1,K+K1)
      Q(L,5,K)=P(L+L1,K+K1)/GD
      IF(I1.EQ.1) GO TO 250
      I1=1
      LORK=LORK+1
      KORL=KORL+1
      L1=-L1
      K1=-K1
      GO TO 225
C     INNER CORNER AND UPPER EDGE OF PROTRUDING SIDEPLATE
C     PROTRUDING EDGE POINTS AT LORKW
  230 IF(J.NE.JLKW) GO TO 232
C      INNER CORNER
      LORK=LORKW
      KORL=KORLW
      L1=-1
      K1=0
      L=LORK
      K=KORL
      IF(IW.EQ.1) GO TO 231
      L1=0
      K1=-1
      K=LORK
      L=KORL
  231 Q(L,1,K)=Q(L+L1,1,K+K1)
      Q(L,5,K)=P(L+L1,K+K1)/GD
C      PROTRUDING EDGE POINTS AT LORKW
  232 IF(J.NE.JKLW) GO TO 235
      LORK=LORKW
```

```
      KORL=KORLW
      L1=-1
      K1=0
      I1=0
  233 L=LORK
      K=KORL
      IF(IW.EQ.1) GO TO 234
      L1=0
      K1=-1
      K=LORK
      L=KORL
  234 Q(L,1,K)=Q(L+L1,1,K+K1)
      Q(L,5,K)=P(L+L1,K+K1)/GD
      IF(I1.EQ.1)GO TO 235
      KORL=KORL+1
      I1=1
      GO TO 233
  235 CONTINUE
C
C     UPPER EDGES
C
      IF(J.LT.JLKW.OR.J.GT.JKLW) GO TO 250
      LORK=LORKW+1
      KORL=KORLW
      I1=0
  237 K=KORL
      L=LORK
      L1=1
      K1=0
      IF(IW.EQ.1) GO TO 240
      L=KORL
      K=LORK
      L1=0
      K1=1
  240 Q(L,1,K)=Q(L+L1,1,K+K1)
      Q(L,5,K)=P(L+L1,K+K1)/GD
      IF(I1.EQ.1) GO TO 250
      I1=1
      KORL=KORL+1
      GO TO 237
  250 CONTINUE
  255 CONTINUE
C     FILTER SOLUTION AT INFLOW BOUNDARY
      INFILT=0
      IF(RM.EQ.0.) RETURN
      IF(INFILT.EQ.0.OR.J1BC.NE.1) RETURN
      IF(NC.EQ.0) RETURN
      J=1
      L1=1
      IF(LAXIS.EQ.0.AND.L1BC.EQ.1.AND.JL1WL.EQ.1) L1=2
      L2=LM
      IF(LW.GT.0) L2=LW-1
      K1=1
      IF(KPLANE.EQ.0.AND.K1BC.EQ.1.AND.JK1WL.EQ.1) K1=2
      K2=KM
      IF(KW.GT.0) K2=KW-1
      IF(KPLANE.EQ.1) K2=1
C     FILTER DENSITY OVER L
      DO 350 K=K1,K2
      DO 320 L=L1,L2
      IF(L-1)315,305,315
  305 S(L,9,K)=.5*(Q(L,1,K)+Q(L+1,1,K))
      GO TO 320
  315 S(L,9,K)=.25*(Q(L-1,1,K)+Q(L+1,1,K)+2.*Q(L,1,K))
  320 CONTINUE
      DO 330 L=L1,L2
  330 Q(L,1,K)=S(L,9,K)
  350 CONTINUE
C     FILTER DENSITY OVER K
      DO 500 L=L1,L2
      IF(K1.EQ.K2) GO TO 400
      DO 380 K=K1,K2
      IF(K-1) 365,355,365
  355 S(L,9,K)=.5*(Q(L,1,K)+Q(L+1,1,K))
      GO TO 380
  365 S(L,9,K)=.25*(Q(L-1,1,K)+Q(L+1,1,K)+2.*Q(L,1,K))
  380 CONTINUE
      DO 390 K=K1,K2
  390 Q(L,1,K)=S(L,9,K)
C     RECOMPUTE MOMENTUM FLUXES AND ENERGY IN TERMS OF FILTERED DENSITY
C     AND OF KNOWN TOTAL PRESSURE, TOTAL TEMPERATURE, AND VELOCITY
C     VECTOR INCLINATION
  400 DO 450 K=K1,K2
      RGMI=(Q(L,1,K)*HTOT(L,K)/PTOT(L,K))**GAMI
      VSQ=2.*HTOT(L,K)*(1.-RGMI)/GAMI
      Q(L,2,K)=Q(L,1,K)*SQRT(VSQ/(1.+VOU(L,K)**2+WOU(L,K)**2))
      Q(L,3,K)=Q(L,2,K)*VOU(L,K)
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            NOZL3D - BC
      Q(L,4,K)=Q(L,2,K)*WOU(L,K)
  450 Q(L,5,K)=Q(L,1,K)*HTOT(L,K)*(GAMMA-GAMI*RGMI)/GD
  500 CONTINUE
      RETURN
      END
```

```
      *DECK BCALJ
            SUBROUTINE BCALJ(K,L)
      *CALL BASE
      *CALL RHSBCC
            COMMON/AXISYM/LAXIS
      C     SET UP MATRICES FOR ALGEBRAIC BC AT UPPER & LOWER BDYS & INT WALLS
            DO 1500 IW=1,2
            CALL SW
            KORL=K
            LORK=L
            IF(IW.EQ.1) GO TO 100
            KORL=L
            LORK=K
        100 IF(LORK.LT.LORKMX) GO TO 600
      C     BC AT K=KMAX OR L=LMAX
            IF(LKMXBC.EQ.0.OR.LKMXBC.GE.3) GO TO 600
            IF(LKMXBC-2) 400,200,200
        200 DO 300 J=JB,JMAX
        300 CALL BCFMAT(J,K,L,1,J)
            GO TO 600
        400 DO 500 J=JB,JMAX
        500 CALL BCWMAT(J,K,L,1,J)
            IF(JMAXBC.EQ.2) CALL BCJMAT(JMAX,K,L,1)
      C     BC AT L=1 OR K=1
        600 IF(LORK.GT.1) GO TO 1100
      C     TEST FOR INTERMEDIATE WALL NORMAL TO LORK=1 SURFACE
            IF(KORLW) 700,700,1000
        700 JBCMIN=MAX0(JLK1WL,JB)
            JBCMAX=JLK1WU
        800 IF(JBCMAX.LE.JBCMIN) GO TO 1100
            DO 900 J=JBCMIN,JBCMAX
        900 CALL BCWMAT(J,K,L,1,J)
            GO TO 1100
       1000 IF(KORL.LT.KORLW) GO TO 700
       1100 CONTINUE
      C     BC AT INTERMEDIATE WALLS
            IF(LORKW.EQ.0) GO TO 1500
            IF(LORK.LT.LORKW.OR.LORK.GT.LORKW+1) GO TO 1500
            IF(KORLW.GT.0.AND.KORL.GT.KORLW+1) GO TO 1500
            JBCMIN=JB
            JBCMAX=JLKW
            IF(JBCMAX.LE.JBCMIN) GO TO 1500
            DO 1200 J=JBCMIN,JBCMAX
       1200 CALL BCWMAT(J,K,L,1,J)
       1500 CONTINUE
      C     SET UP MATRIX ELEMENTS FOR USE OF LAGGED B.C.
      C     SINGULAR AXIS L= FOR AXIAL SYMMETRY (LAXIS=1)
            IF (L.NE.LAXIS) GO TO 80
            DO 75 J=1,JMAX
         75 CALL ZERODQ(J)
            GO TO 155
      C     INTERNAL CORNER AT KMAX,LMAX
         80 IF (KMAXBC.NE.1.OR.LMAXBC.NE.1) GO TO 90
            IF (K*L.NE.KMAX*LMAX) GO TO 90
            DO 85 J=1,JMAX
         85 CALL ZERODQ(J)
            GO TO 155
      C     CORNER AT L=1, K=1
         90 IF (K*L.NE.1) GO TO 101
            IF (JK1WU*JL1WU.LE.0) GO TO 101
            J2=MIN0(JK1WU,JL1WU)
            J1=MAX0(1,JK1WL,JL1WL)
            IF (J2.LT.J1) GO TO 101
            DO 95 J=J1,J2
         95 CALL ZERODQ(J)
      C     TRAILING EDGES AND CORNERS OF INTERMEDIATE WALLS
            IF(KW.LE.0 .AND. LW.LE.0) GO TO 155
        101 DO 135 IW=1,2
            CALL SW
            KORL=K
            LORK=L
            IF (IW.EQ.1) GO TO 105
            KORL=L
            LORK=K
        105 IF (KORLW.LE.0) GO TO 135
            IF (KORL.LT.KORLW.OR.KORL.GT.KORLW+1) GO TO 135
      C     TRAILING EDGE OF WALL KORL=KORLW
            IF (LORKW) 115,115,110
        110 IF (LORK.GT.LORKW) GO TO 125
        115 CALL ZERODQ(JKLW)
      C     CORNER OF INTERSECTION WITH PLUG AT LORK=1
            IF (LORK.NE.1.OR.KORL.NE.KORLW) GO TO 125
            J2=JLK1WU
            J1=MAX0(JLK1WL,1)
            IF (J2.LT.J1) GO TO 125
            DO 120 J=J1,J2
```

```
  120 CALL ZERODQ(J)
C     INNER EDGE OF PROTRUDING SIDEPLATE
  125 IF(LORKW.EQ.0) GO TO 135
      IF (LORK.NE.LORKW+1.OR.KORL.NE.KORLW) GO TO 135
      IF (JLKW.GE.JKLW) GO TO 135
      DO 130 J=JLKW,JKLW
  130 CALL ZERODQ(J)
  135 CONTINUE
C     CORNERS WHERE THE INTERMEDIATE WALLS INTERSECT
      IF (KW*LW.LE.0) GO TO 155
      IF (L.NE.LW.OR.K.NE.KW) GO TO 145
      J2=MIN0(JKW,JLW)
      DO 140 J=1,J2
  140 CALL ZERODQ(J)
      GO TO 155
  145 IF (L.NE.LW+1.OR.K.NE.KW+1) GO TO 155
      J2=MAX0(JKW,JLW)
      DO 150 J=1,J2
  150 CALL ZERODQ(J)
  155 CONTINUE
C
C     PRESEVE INITIAL DATA AT INFLOW PLANE J=1 IN REGION OUTSIDE NOZZLE
      IF(LW) 2100,2100,2300
 2100 IF(KW.LE.0) GO TO 3000
      IF(K.LE.KW) GO TO 3000
 2200 CALL ZERODQ(1)
      GO TO 3000
 2300 IF(KW) 2400,2400,2500
 2400 IF(L.LE.LW) GO TO 3000
      GO TO 2200
 2500 IF(K.GT.KW .AND. L.GT.LW) CALL ZERODQ(1)
 3000 CONTINUE
C
C      LAGGED B.C. FOR NOZZLE LIP WALL POINTS AT J=JMAX WHEN JMAXBC=2
C     (OUTFLOW B.C. P=FSP IMPOSED)
C
      IF(JMAXBC.NE.2) GO TO 9999
      IF(ITW .EQ. 1) GO TO 9999
      J = JMAX
C
C      HORIZONTAL WALLS AT L=1,LMAX
C
      IF(L .EQ. LMAX .AND. LMAXBC .EQ. 1) CALL ZERODQ(J)
C
C      VERTICAL WALLS AT K=1,KMAX
C
      IF(KPLANE .EQ. 1) GO TO 9999
      IF(K .EQ. KMAX .AND. KMAXBC .EQ. 1) CALL ZERODQ(J)
 9999 RETURN
      END
```

```
      *DECK BCALKL
            SUBROUTINE BCALKL(JJ,LORK,IWW)
      *CALL BASE
      *CALL RHSBCC
            COMMON/AXISYM/LAXIS
            ISW=IWW+1
            IW=IWW
            J=JJ
            CALL SW
      C     SET UP MATRICES FOR ALGEBRAIC BC AT LOWER,UPPER BDYS AND INT WALLS
            IF(LORK.LT.LORKMX) GO TO 230
      C     BC AT LORK=LORKMX
            IF(LKMXBC.LT.1.OR.LKMXBC.GT.2) GO TO 230
            IF(LKMXBC-2) 220,210,210
      C     FREESTREAM BC
        210 DO 215 K=KLORLL,KUORLU
            KR=K
            LR=LORK
            IF(IW.EQ.1) GO TO 215
            KR=LORK
            LR=K
        215 CALL BCFMAT(J,KR,LR,ISW,KR)
            GO TO 230
      C     WALL BC
        220 DO 225 K=KLORLL,KUORLU
            KR=K
            LR=LORK
            IF(IW.EQ.1) GO TO 223
            KR=LORK
            LR=K
        223 CALL BCWMAT(J,KR,LR,ISW,KR)
            IF(J.EQ.JMAX .AND. JMAXBC.EQ.2) CALL BCJMAT(J,KR,LR,ISW)
        225 CONTINUE
      C     BC AT INTERMEDIATE WALLS
        230 IF(KORLW.LE.0) GO TO 260
            IF(J.GT.JKLW) GO TO 260
            IF(LORKW.GT.0.AND.LORK.GT.LORKW+1) GO TO 280
            KR=KORLW
            LR=LORK
            IF(IW.EQ.1) CALL BCWMAT(J,KR+1,LR,ISW,KR+1)
            IF(IW.EQ.1) GO TO 240
            KR=LORK
            LR=KORLW
            CALL BCWMAT(J,KR,LR+1,ISW,KR)
        240 CALL BCWMAT(J,KR,LR,ISW,KR)
        260 IF(LORKW.LE.0) GO TO 280
            IF(J.GT.JLKW) GO TO 280
            IF(LORK.LT.LORKW.OR.LORK.GT.LORKW+1) GO TO 280
            KBCMAX=KORLMX
            IF(KORLW.GT.0) KBCMAX=KORLW+1
            DO 270 K=KLORLL,KBCMAX
            KR=K
            LR=LORK
            IF(IW.EQ.1) GO TO 270
            KR=LORK
            LR=K
        270 CALL BCWMAT(J,KR,LR,ISW,KR)
      C     BC AT LORK=1
        280 IF(LORK.NE.1.OR.LK1BC.EQ.0) GO TO 287
            KBCMAX=KORLMX
            IF(KORLW.GT.0) KBCMAX=KORLW
            IF(J.LT.JLK1WL.OR.J.GT.JLK1WU) GO TO 290
            DO 285 K=KLORLL,KBCMAX
            KR=K
            LR=LORK
            IF(IW.EQ.1) GO TO 283
            KR=LORK
            LR=K
        283 CALL BCWMAT(J,KR,LR,ISW,KR)
            IF(J.EQ.JMAX .AND. JMAXBC.EQ.2) CALL BCJMAT(J,KR,LR,ISW)
        285 CONTINUE
      C     BC AT KORL=1
        287 IF(KL1BC.EQ.0) GO TO 320
      C     TEST FOR INTERMEDIATE WALL
        290 IF(LORKW) 300,300,310
        300 IF(J.LT.JKL1WL.OR.J.GT.JKL1WU) GO TO 320
            KR=1
            LR=LORK
            IF(IW.EQ.1) GO TO 305
            KR=LORK
            LR=1
        305 CALL BCWMAT(J,KR,LR,ISW,KR)
            IF(J.EQ.JMAX .AND. JMAXBC.EQ.2) CALL BCJMAT(J,KR,LR,ISW)
            GO TO 320
        310 IF(LORK.LE.LORKW) GO TO 300
      C     BC AT KORL=KORLMX
```

```
 87    320 IF(KLMXBC.LT.1.OR.KLMXBC.GT.2) GO TO 105
 88        KR=KORLMX
 89        LR=LORK
 90        IF(IW.EQ.1) GO TO 335
 91        KR=LORK
 92        LR=KORLMX
 93    335 IF(KLMXBC-2) 340,330,330
 94  C     FREESTREAM BC
 95    330 CALL BCFMAT(J,KR,LR,ISW,KR)
 96        GO TO 105
 97  C     WALL BC
 98    340 CALL BCWMAT(J,KR,LR,ISW,KR)
 99        IF(J.EQ.JMAX .AND. JMAXBC.EQ.2) CALL BCJMAT(J,KR,LR,ISW)
100    105 CONTINUE
101  C     SET UP MATRIX ELEMENTS FOR USE OF LAGGED B.C.
102  C     SINGULAR AXIS L=1 FOR AXISYMMETRIC FLOW
103        IF (IW.NE.1.OR.LORK.NE.LAXIS) GO TO 115
104        DO 110 K=KLORLL,KUORLU
105    110 CALL ZERODQ(K)
106    115 IF(IW.EQ.2.AND.LAXIS.EQ.1) CALL ZERODQ(1)
107  C
108  C      NOZZLE LIP WALL POINTS AT J=JMAX FOR JMAXBC=2
109  C      (OUTFLOW B.C. P=FSP IMPOSED)
110  C
111        IF(JMAXBC .NE. 2 .OR. J .NE. JMAX) GO TO 700
112        IF(KPLANE .EQ. 1 .AND. ISW .EQ. 2) GO TO 700
113        IF(ITW .EQ. 1) GO TO 700
114  C
115  C      WALL AT LORK=LORKMX
116  C
117    630 IF(LORK .NE. LORKMX) GO TO 680
118        IF(LKMXBC .NE. 1) GO TO 680
119        DO 670 K=KLOROLL,KORLMX
120    670 CALL ZERODQ(K)
121    680 CONTINUE
122  C
123  C     WALL AT KORL=KORLMX
124  C
125        IF(KLMXBC .EQ. 1) CALL ZERODQ(KORLMX)
126    700 CONTINUE
127  C     INTERNAL CORNER AT K,L=KMAX,LMAX
128        IF (LKMXBC*KLMXBC.NE.1) GO TO 120
129        IF (LORK.NE.LORKMX) GO TO 120
130        CALL ZERODQ(KORLMX)
131  C     CORNERS IN PLANE LORK=1
132    120 IF (LORK.NE.1) GO TO 125
133  C     CORNER AT (K,L)=(1,1)
134        IF(J.GE.MAX0(JLK1WL,JKL1WL).AND.J.LE.MIN0(JLK1WU,JKL1WU))
135       1     CALL ZERODQ(1)
136  C     CORNER WHERE PLUG INTERSECTS SIDEWALL
137        IF (KORLW.LE.0) GO TO 125
138        IF(J.GE.JLK1WL.AND.J.LE.JLK1WU) CALL ZERODQ(KORLW)
139  C     TRAILING EDGES OF LONE INTERMEDIATE WALLS
140    125 IF (KORLW.GT.0) GO TO 135
141  C     TRAILING EDGE OF LONE HORIZONTAL WALL
142        IF (LORKW.LE.0.OR.J.NE.JLKW) GO TO 175
143        IF (LORK.NE.LORKW.AND.LORK.NE.LORKW+1) GO TO 175
144        DO 130 K=KLORLL,KUORLU
145    130 CALL ZERODQ(K)
146        GO TO 175
147  C     TRAILING EDGE OF LONE VERTICAL WALL
148    135 IF (LORKW.GT.0) GO TO 140
149        IF (J.NE JKLW) GO TO 175
150        CALL ZERODQ(KORLW)
151        CALL ZERODQ(KORLW+1)
152        GO TO 175
153  C     EDGES AND CORNERS OF COEXISTENT INTERMEDIATE WALLS
154    140 IF (LORK.GT.LORKW) GO TO 160
155        IF (J.NE.JKLW) GO TO 145
156  C     TRAILING EDGE OF VERTICAL SIDEPLATE
157        CALL ZERODQ(KORLW)
158        CALL ZERODQ(KORLW+1)
159  C     CORNERS AND EDGES ON LOWER SURFACE OF HORIZONTAL WALL
160    145 IF (LORK.NE.LORKW) GO TO 175
161  C     INTERSECTION OF HORIZONTAL WALL AND SIDEPLATE
162        IF(J.LE.MIN0(JKLW,JLKW)) CALL ZERODQ(KORLW)
163  C     INTERSECTION OF HORIZONTAL WALL AND VERTICAL PLUG
164        IF(JKL1WL.LE.J.AND.J.LE.JKL1WU) CALL ZERODQ(1)
165  C     TRAILING EDGE OF HORIZONTAL WALL
166        IF (J.NE.JLKW) GO TO 155
167        K2=KORLW
168        IF(JLKW.GT.JKLW) K2=KORLW+1
169        DO 150 K=1,K2
170    150 CALL ZERODQ(K)
171  C     INSIDE OF PROTRUDING SIDEPLATE
172    155 IF(JKLW.LE.J.AND.J.LE.JLKW) CALL ZERODQ(KORLW+1)
173        GO TO 175
```

```
174     160 IF (LORK.GT.LORKW+1) GO TO 175
175   C     CORNERS AND EDGES ON UPPER SURFACE OF HORIZONTAL WALL
176   C     INTERSECTION WITH VERTICAL WALL
177         IF(J.LE.MAXO(JKLW,JLKW))CALL ZERODQ(KORLW+1)
178   C     TRAILING EDGE
179         IF (J.NE.JLKW) GO TO 170
180         DO 165 K=1,KORLW
181     165 CALL ZERODQ(K)
182   C     INSIDE EDGE OF PROTRUDING SIDEPLATE
183     170 IF(JLKW.LE.J.AND.J.LE.JKLW) CALL ZERODQ(KORLW)
184     175 CONTINUE
185   C     PRESERVE INITIAL DATA AT INFLOW PLANE J=1 IN REGION OUTSIDE NOZZLE
186         IF(J.NE.1) GO TO 800
187         IF(LORKW) 755,755,775
188     755 IF(KORLW.LE.0) GO TO 800
189     760 K1=KORLW+1
190     765 DO 770 K=K1,KORLMX
191     770 CALL ZERODQ(K)
192         GO TO 800
193     775 IF(LORK-LORKW) 780,780,785
194     780 IF(KORLW.LE.0) GO TO 800
195         GO TO 760
196     785 K1=1
197         GO TO 765
198     800 CONTINUE
199         RETURN
200         END
```

```
 1  *DECK BCFMAT
 2        SUBROUTINE BCFMAT(J,K,L,ISW,JK)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL BTRID
 6  *CALL VARS2
 7        COMMON/FREESP/FSP,FSRHO
 8  C
 9  C     IMPLICIT MATRIX DEFINITIONS FOR ALGEBRAIC FREESTREAM BC AT LORK=LORKMX WHE
10  C     ISW=1,2,3 FOR THE ADI SWEEPS IN J,K,L DIRECTIONS,RESP. THE SWEEPS
11  C   MUST BE PERFORMED IN THE ORDER J,K,L.
12  C
13  C     ENFORCE FREESTREAM AXIAL VELOCITY U=FSMACH, PRESSURE FSP,
14  C     AND DENSITY FSRHO AT J,K,L.
15  C
16        RR=1.0/Q(L,1,JK)
17        U=Q(L,2,JK)*RR
18        V=Q(L,3,JK)*RR
19        W=Q(L,4,JK)*RR
20        XKE=0.5*(U**2+V**2+W**2)
21        PJAY=GD*(Q(L,5,JK)-XKE*Q(L,1,JK))
22        PFSJAY=FSP
23        RFSJAY=FSRHO
24        I=L
25        IF (ISW-2) 15,20,25
26     15 I=J
27        GO TO 25
28     20 I=K
29     25 DO 30 M=1,5
30        A(I,1,M)=0.0
31        B(I,1,M)=0.0
32        C(I,1,M)=0.0
33        A(I,2,M)=0.0
34        B(I,2,M)=0.0
35        C(I,2,M)=0.0
36        A(I,5,M)=0.0
37        B(I,5,M)=0.0
38     30 C(I,5,M)=0.0
39        B(I,1,1)=1.0*QS(L,JK)
40        B(I,2,1)=-FSMACH*QS(L,JK)
41        B(I,2,2)=1.0*QS(L,JK)
42        B(I,5,1)=XKE*QS(L,JK)
43        B(I,5,2)=-U*QS(L,JK)
44        B(I,5,3)=-V*QS(L,JK)
45        B(I,5,4)=-W*QS(L,JK)
46        B(I,5,5)=1.0*QS(L,JK)
47        IF (ISW-2) 35,40,40
48     35 F(I,2)=(FSMACH*Q(L,1,JK)-Q(L,2,JK))*QS(L,JK)
49        F(I,5)=((PFSJAY-PJAY)/GD)*QS(L,JK)
50        F(I,1)=(RFSJAY-Q(L,1,JK))*QS(L,JK)
51        RETURN
52     40 DO 45 N=1,4
53     45 F(I,5)=F(I,5)+B(I,5,N)*F(I,N)/QS(L,JK)
54        F(I,2)=(B(I,2,1)*F(I,1)+B(I,2,2)*F(I,2))/QS(L,JK)
55        F(I,1)=(B(I,1,1)*F(I,1))/QS(L,JK)
56        RETURN
57        END
```

```
 1  *DECK BCJMAT
 2        SUBROUTINE BCJMAT(J,K,L,ISW)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL BTRID
 6  C     COMMON FREESP CONTAINS FREESTREAM PRESSURE
 7        COMMON/FREESP/FSP
 8  *CALL VARS2
 9  C     IMPLICIT MATRIX DEFINITIONS FOR ALGEBRAIC B.C. AT J=1,JMAX.
10  C     ISW=1,2,3 FOR THE ADI SWEEPS IN J,K,L DIRECTIONS,RESP. THE SWEEPS
11  C   MUST BE PERFORMED IN THE ORDER J,K,L.
12        JK=J
13        IF(ISW.GT.1) JK=K
14        RR=1.0/Q(L,1,JK)
15        U=Q(L,2,JK)*RR
16        V=Q(L,3,JK)*RR
17        W=Q(L,4,JK)*RR
18        XKE=0.5*(U**2+V**2+W**2)
19        PJAY=GD*(Q(L,5,JK)-XKE*Q(L,1,JK))
20        PFSJAY=FSP
21        I=L
22        IF (ISW-2) 10,15,20
23     10 I=J
24        GO TO 20
25     15 I=K
26     20 IF (J-1) 50,50,25
27     25 IF (JMAXBC.NE.2) GO TO 145
28  C   ENFORCE FREESTREAM PRESSURE B.C. P=FSP AT OUTFLOW
29  C   BOUNDARY J=JMAX (INPUT OPTION JMAXBC=2)
30  C
31  C     THIS ALGEBRAIC B.C. IS USED IN PLACE OF THE ENERGY EQUATION TO
32  C     MAINTAIN CONSISTENCY WITH THE WALL B.C. AT WALL POINTS
33  C
34        IF(L .EQ. LMAX .AND. LMAXBC .EQ. 1) GO TO 26
35        IF(K .EQ. KMAX .AND. KMAXBC .EQ. 1) GO TO 26
36        GO TO 300
37     26 CONTINUE
38        DO 30 M=1,5
39        A(I,5,M)=0.0
40        B(I,5,M)=0.0
41     30 C(I,5,M)=0.0
42        B(I,5,1)=XKE*Q6(L,JK)
43        B(I,5,2)=-U*Q6(L,JK)
44        B(I,5,3)=-V*Q6(L,JK)
45        B(I,5,4)=-W*Q6(L,JK)
46        B(I,5,5)=1.0*Q6(L,JK)
47        IF (ISW-2) 35,40,40
48     35 F(I,5)=(PFSJAY-PJAY)/GD*Q6(L,JK)
49        GO TO 145
50     40 FSVP=0.0
51        DO 45 M=1,5
52     45 FSVP=FSVP+B(I,5,M)*F(I,M)
53        F(I,5)=FSVP/Q6(L,JK)
54  C ENFORCE WALL TEMPERATURE B.C. AT WALL POINTS OF THE OUTFLOW BOUNDARY
55  C     WHEN TW.GT.0 .  THE ALGEBRAIC B.C. RHO*TW=GAMMA*(GAMMA-1.)*EPSLON
56  C     REPLACES THE CONTINUITY EQUATION IN THIS CASE.
57    300 IF(ITW.EQ.0) GO TO 145
58        THW=TW/GD
59        IF(L-LMAX) 46,47,145
60     46 IF(K-KMAX) 145,47,145
61     47 DO 200 M=1,5
62        A(I,1,M)=0.
63        B(I,1,M)=0.
64    200 C(I,1,M)=0.
65        B(I,1,1)=THW*Q6(L,JK)
66        B(I,1,5)=-Q6(L,JK)
67        F(I,5)=0.
68        GO TO 145
69  C     FOR INPUT OPTION J1BC=1, WE
70  C   ENFORCE TWO IMPLICIT INFLOW B.C.AT J=1 ON VELOCITY VECTOR DIREC-
71  C   TION COSINES V/U,W/U. THESE REPLACE THE V,W MOMENTUM EQ'S.,RESP.
72  C     FOR OPTION J1BC=2, WE COMPUTE V,W FROM THEIR MOMENTUM EQUATIONS.
73     50 IF (J1BC.GT.1) GO TO 70
74        DO 55 N=3,4
75        DO 55 M=1,5
76        A(I,N,M)=0.0
77        B(I,N,M)=0.0
78        C(I,N,M)=0.0
79     55 CONTINUE
80        B(I,3,2)=-VOU(L,K)*Q6(L,JK)
81        B(I,3,3)=Q6(L,JK)
82        B(I,4,2)=-WOU(L,K)*Q6(L,JK)
83        B(I,4,4)=Q6(L,JK)
84        IF (ISW-2) 60,65,65
85     60 F(I,3)=(VOU(L,K)*Q(L,2,JK)-Q(L,3,JK))*Q6(L,JK)
86        F(I,4)=(WOU(L,K)*Q(L,2,JK)-Q(L,4,JK))*Q6(L,JK)
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```
      GO TO 70
   65 F(I,3)=(B(I,3,2)*F(I,2)+B(I,3,3)*F(I,3))/Q6(L,JK)
      F(I,4)=(B(I,4,2)*F(I,2)+B(I,4,4)*F(I,4))/Q6(L,JK)
C    ENFORCE TWO IMPLICIT INFLOW B.C. ON TOTAL ENTHALPY HTOT AND TOTAL
C    PRESSURE PTOT. J1BC.LT.0 SELECTS AN MOC RELATION TO CLOSE THE
C    SYSTEM. FOR J1BC.GT.0 THE SYSTEM IS CLOSED WITH EITHER THE CONTINU
C    ITY, THE U-MOMENTUM, OR THE ENERGY EQUATION BY DEFINING NX=1,2,OR
C    5, RESP.
C      FOR J1BC=3 THE U-MOMENTUM EQ. IS REPLACED BY THE IMPLICIT RELATION
C      D(U)/D(XI)=0
   70 IF (J1BC) 75,80,80
   75 NX=1
      NPT=2
      NHT=5
C    MOC RELATION FOR B(I,NX,M), C(I,NX,M),F(I,NX) GOES HERE
      GO TO 105
   80 CONTINUE
C    DEFINE NX FOR J1BC.GT.0
      NX=INXBC
      IF (LW.LE.0) GO TO 85
      KR=KMAX
      IF(KW.GT.0) KR=KW
      IF(K.GT.KR) GO TO 85
      IF(L.EQ.LW .OR. L.EQ.LW+1) NX=2
   85 IF (KW.LE.0) GO TO 90
      LR=LMAX
      IF(LW.GT.0) LR=LW
      IF(L.GT.LR) GO TO 90
      IF(K.EQ.KW.OR.K.EQ.KW+1) NX=2
   90 IF(L.EQ.LMAX .AND. LMAXBC.EQ.1) NX=2
      IF(K.EQ.KMAX .AND. KMAXBC.EQ.1) NX=2
      IF(L.EQ.1 .AND. L1BC.EQ.1 .AND. JL1WL.LE.J .AND. J.LE.JL1WU) NX=2
      IF(K.EQ.1 .AND. K1BC.EQ.1 .AND. JK1WL.LE.J .AND. J.LE.JK1WU) NX=2
      NPT=2
      NHT=5
      IF (NX-2) 105,95,100
   95 NPT=1
      GO TO 105
  100 NPT=1
      NHT=2
  105 DO 110 M=1,5
      A(I,NPT,M)=0.0
      B(I,NPT,M)=0.0
      C(I,NPT,M)=0.0
      A(I,NHT,M)=0.0
      B(I,NHT,M)=0.0
  110 C(I,NHT,M)=0.0
      JK=JK
      HG=HTOT(L,K)/GAMI
      IF (J1BC.EQ.3) GO TO 115
      GCR=HG*(Q(L,1,JK)*HTOT(L,K)/PTOT(L,K))**GAMI
      B(I,NPT,1)=(XKE-GCR)*Q6(L,JK)
      B(I,NPT,2)=-U*Q6(L,JK)
      B(I,NPT,3)=-V*Q6(L,JK)
      B(I,NPT,4)=-W*Q6(L,JK)
      B(I,NPT,5)=1.0*Q6(L,JK)
      GO TO 125
  115 IF (ISW.GE.2) GO TO 120
      B(I,NPT,1)=Q(L,2,JK)/Q(L,1,JK)**2
      B(I,NPT,2)=-1.0/Q(L,1,JK)
      C(I,NPT,1)=-Q(L,2,JK+1)/Q(L,1,JK+1)**2
      C(I,NPT,2)=1.0/Q(L,1,JK+1)
      GO TO 125
  120 B(I,NPT,2)=1.0
  125 B(I,NHT,1)=(HG-GAMI*XKE)*Q6(L,JK)
      B(I,NHT,2)=GAMI*U*Q6(L,JK)
      B(I,NHT,3)=GAMI*V*Q6(L,JK)
      B(I,NHT,4)=GAMI*W*Q6(L,JK)
      B(I,NHT,5)=-GAMMA*Q6(L,JK)
      IF (ISW-2) 130,135,135
  130 IF(J1BC.LE.2) F(I,NPT)=((XKE+(GCR/GAMMA))*Q(L,1,JK)-Q(L,5,JK))
     1    *Q6(L,JK)
      IF(J1BC.EQ.3)F(I,NPT)=(Q(L,2,JK)/Q(L,1,JK)-Q(L,2,JK+1)/Q(L,1,JK+1)
     1)*Q6(L,JK)
      F(I,NHT)=(GAMMA*Q(L,5,JK)-Q(L,1,JK)*(HG+GAMI*XKE))*Q6(L,JK)
      GO TO 145
  135 FSVP=0.0
      FSVH=0.0
      DO 140 M=1,5
      FSVP=FSVP+B(I,NPT,M)*F(I,M)
  140 FSVH=FSVH+B(I,NHT,M)*F(I,M)
      F(I,NPT)=FSVP/Q6(L,JK)
      F(I,NHT)=FSVH/Q6(L,JK)
  145 RETURN
      END
```

```
1   *DECK BCLKMX
2         SUBROUTINE BCLKMX(IWW,JJ,K)
3   *CALL BASE
4   *CALL VARS1
5   *CALL BTRID
6   *CALL RHSBCC
7   *CALL VARS2
8   C     IMPLICIT OUTFLOW BOUNDARY CONDITIONS (LORKMXBC=2 OR 5),OR WALL BC
9   C    (LKMXBC=3), OR SYMMETRY BC (LKMXBC=3,4) AT GRID POINTS L=LORKMX.
10  C     IMPLICIT WALL BC INTERMEDIATE WALL LOWER SURFACE L=LORKW,J.LE.JLKW
11  C     FILLS IN LAST ROW OF BLOCK - TRIDIAGONAL COEFFICIENT MATRIX TO
12  C    ACCOUNT FOR IMPLICIT PORTION OF INVISCID FLUX VECTOR TERMS, AND
13  C    FILLS IN LAST ROW OF RIGHT HAND SIDE VECTOR AS COMPUTED IN SUBR.
14  C    RHS. THE IMPLICIT PORTION OF THE VISCOUS TERMS FOR THE ZETA(L)
15  C     OR ETA(K)  DIRECTION ARE ADDED IN BY SUBROUTINE VISMAT.
16        IW=IWW
17        J=JJ
18        CALL SW
19        LKWR=LORKW+1
20        KLWR=KORLW+1
21        INTWAL=0
22        IF(LORKW.GT.0.AND.J.LE.JLKW) INTWAL=1
23        IF(KORLW.GT.0.AND.K.GE.KLWR) INTWAL=0
24  C     BC AT UPPER BOUNDARY LORKMX
25        L=LORKMX
26    100 LOPR=L
27        KORL=K
28        LMM=L-1
29        KMM=K
30        IF(IW.EQ.1) GO TO 200
31        LORK=K
32        KORL=L
33        LMM=LORK
34        KMM=KORL-1
35    200 CONTINUE
36        RJ=Q6(LORK,KORL)
37        RR = RM * (RJ+Q6(LMM,KMM))
38        IF(L.EQ.LORKMX.AND.(LKMXBC.EQ.3.OR.LKMXBC.EQ.4)) GO TO 500
39        DO 400 N=1,5
40        DO 300 M=1,5
41        C(L,N,M)=0.0
42        A(L,N,M) = -2.0*D(L-1,N,M)
43    300 B(L,N,M) = 2.0*D(L,N,M)
44        A(L,N,N) = A(L,N,N) +(-RR+(1.0-WTFAC)*RJ)
45        B(L,N,N) = WTFAC*RJ + RR + B(L,N,N)
46    400 F(L,N) = S(LORK,N+8,KORL)
47  C     SYMMETRY BC FOR INVISCID TERMS AT UPPER BOUNDARY LORKMX
48        IF(L-LORKMX) 900,850,850
49    500 DO 700 N=1,5
50        DO 600 M=1,5
51        C(L,N,M)=0.0
52        B(L,N,M)=0.0
53    600 A(L,N,M)=-2.0*D(L-1,N,M)
54        B(L,N,N)=Q6(LORK,KORL)+RR
55        A(L,N,N)=A(L,N,N)-RR
56    700 F(L,N)=S(LORK,N+8,KORL)
57        DO 800 M=1,5
58        A(L,LKMXBC,M)=0.0
59    800 F(L,LKMXBC)=0.0
60  C     BC AT INTERMEDIATE WALL
61    850 IF(INTWAL.EQ.0) GO TO 900
62        L=LORKW
63        GO TO 100
64    900 RETURN
65        END
```

```
*DECK BCLK1
      SUBROUTINE BCLK1(IWW,JJ,K)
*CALL BASE
*CALL VARS1
*CALL BTRID
*CALL RHSBCC
*CALL VARS2
C   IMPLICIT WALL BC AT GRID POINTS LK=1 AND J.GE.JLK1WL.OR.J.LE.JLK1WU
C     AND SYMMETRY BC OUTSIDE THAT J INTERVAL. INPLICIT WALL BC AT
C     INTERMEDIATE WALL UPPER SURFACE L=LORKW+1 AND J.LE.JLKW.
C   FILLS IN FIRST ROW OF COEFFICIENT MATRIX TO ACCOUNT FOR IMPLICIT
C   PORTION OF INVISCID FLUX VECTOR TERMS, AND FILLS IN FIRST ROW OF
C   RIGHT HAND SIDE VECTOR AS COMPUTED IN SUBROUTINE RHS. FOR
C   ADIABATIC WALL, THE IMPLICIT PORTION OF THE VISCOUS TERMS IN THE
C   ENERGY EQ FOR ZETA(L) OR ETA(K) DIRECTION ARE ADDED BY SUBR VISMAT.
C     THE EXTRA MATRIX MULTIPLY THAT ACCOUNTS FOR ZERO VELOCITY B.C.
C   AND FOR PRESCRIBED WALL TEMP BC (ITW=1) IS PERFORMED IN  SUBR BCWMAT
      IW=IWW
      J=JJ
      CALL SW
      LKWR=LORKW+1
      KLWR=KORLW+1
      INTWAL=0
      IF(LORKW.GT.0.AND.J.LE.JLKW) INTWAL=1
      IF(KORLW.GT.0.AND.K.GE.KLWR) INTWAL=0
C     BC AT L=1
      L=1
   50 LORK=L
      KORL=K
      LP=L+1
      KP=K
      IF(IW.EQ.1) GO TO 75
      LORK=K
      KORL=L
      LP=LORK
      KP=KORL+1
   75 RJ=Q6(LORK,KORL)
      RF=RM*(RJ+Q6(LP,KP))
C     BC AT L=1
      IF(L.GT.1) GO TO 150
C     TEST FOR INTERMEDIATE WALL NORMAL TO L=1 SURFACE
      IF(KORLW) 100,100,130
C     TEST FOR WALL AT L=1
  100 IF(JLK1WL.LE.J.AND.J.LE.JLK1WU) GO TO 150
C     SYMMETRY
      GO TO 190
C     TEST FOR WALL AT L=1
  130 IF(K-KORLW) 100,100,190
  150 DO 180 N=1,5
      DO 170 M=1,5
      A(L,N,M)=0.0
      B(L,N,M)=-2.0*D(L,N,M)
  170 C(L,N,M)=2.0*D(L+1,N,M)
      B(L,N,N)=B(L,N,N)+(WTFAC*RJ+RF)
      C(L,N,N)=C(L,N,N)+(-RF+(1.0-WTFAC)*RJ)
  180 F(L,N)=S(LORK,N+8,KORL)
      IF(L.EQ.1) GO TO 250
C
C   SYM BC J.LT.JLK1WL.OR.J.GT.JLK1WU FOR INVISCID TERMS AT LWER BDY L=1
C
  190 IF(L.GT.1) GO TO 300
      DO 210 N=1,5
      DO 200 M=1,5
      A(L,N,M)=0.0
      B(L,N,M)=0.0
  200 C(L,N,M)=2.0*D(L+1,N,M)
      B(L,N,N)=Q6(LORK,KORL)+RF
      C(L,N,N)=C(L,N,N)-RF
  210 F(L,N)=S(LORK,N+8,KORL)
      IF(IW.EQ.2) GO TO 230
      DO 220 M=1,5
  220 C(L,4,M)=0.0
      F(L,4)=0.0
      GO TO 250
  230 DO 240 M=1,5
  240 C(L,3,M)=0.0
      F(L,3)=0.0
C     BC AT INTERMEDIATE WALL
  250 IF(INTWAL.EQ.0) GO TO 300
      L=LKWR
      GO TO 50
  300 RETURN
      END
```

```
1  *DECK BCWMAT
2        SUBROUTINE BCWMAT(J,K,L,ISW,JK)
3  *CALL BASE
4  *CALL VARS1
5  *CALL BTRID
6  *CALL VARS2
7  C
8  C     IMPLICIT MATRIX DEFINITIONS FOR ALGEBRAIC WALL BC AT (J,K,L)
9  C     ISW=1,2,3 FOR THE ADI SWEEPS IN J,K,L DIRECTIONS,RESP. THE SWEEPS
10 C   MUST BE PERFORMED IN THE ORDER J,K,L.
11 C
12       IF (ITW) 10,10,40
13 C     VELOCITY B.C. FOR ADIABATIC WALL AND ZERO MASS TRANSFER
14    10 I=L
15       IF (ISW-2) 15,20,25
16    15 I=J
17       GO TO 25
18    20 I=K
19    25 DO 30 N=2,4
20       DO 30 M=1,5
21       A(I,N,M)=0.0
22       B(I,N,M)=0.0
23       C(I,N,M)=0.0
24    30 CONTINUE
25       DO 35 N=2,4
26       F(I,N)=0.0
27    35 B(I,N,N)=Q6(L,JK)
28       RETURN
29 C     VELOCITY AND TEMPERATURE B.C. FOR PRESCRIBED WALL TEMP. TW AND
30 C   NORMAL MASS INJECTION RATE WMDOT
31 C   ZETA(L) DIRECTION IS ASSUMED NORMAL  TO WALL
32 C   WMDOT IS ASSUMED ZERO BELOW
33 C
34    40 THW=TW/GO
35       I=L
36       IF (ISW-2) 45,50,55
37    45 I=J
38       GO TO 55
39    50 I=K
40    55 DO 65 N=2,5
41       DO 60 M=1,5
42       A(I,N,M)=0.0
43       B(I,N,M)=0.0
44    60 C(I,N,M)=0.0
45    65 B(I,N,N)=Q6(L,JK)
46       B(I,5,1)=THW*Q6(L,JK)
47       B(I,5,5)=-Q6(L,JK)
48       DO 70 N=2,5
49    70 F(I,N)=0.0
50       RETURN
51       END
```

```
                NOZL3D - BCXIN
 1  *DECK BCXIN
 2        SUBROUTINE BCXIN(L)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL BTRID
 6  *CALL VARS2
 7  C         IMPLICIT INFLOW B.C. AT GRID POINTS J=1
 8  C    FILLS IN FIRST ROW OF COEFFICIENT MATRIX TO ACCOUNT FOR IMPLICIT
 9  C    PORTION OF INVISCID FLUX VECTOR TERMS, AND FILLS IN FIRST ROW OF
10  C    RIGHT HAND SIDE VECTOR AS COMPUTED IN SUBRS. RHS AND VISRHS.
11  C       THE EXTRA MATRIX MULTIPLY THAT ACCOUNTS FOR ALGEBRAIC B.C.
12  C    IS PERFORMED IN SUBR. BCJMAT
13  C
14          J=1
15          JF=J+1
16          RJ=Q6(L,J)
17          RF=RM * (RJ+Q6(L,JF))
18          DO 20 N=1,5
19          DO 15 M=1,5
20          A(J,N,M)=0.0
21          B(J,N,M)=-2.0*D(J,N,M)
22       15 C(J,N,M)=2.0*D(J+1,N,M)
23          B(J,N,N)=B(J,N,N)+(WTFAC*RJ+RF)
24          C(J,N,N)=C(J,N,N)+(-RF+(1.0-WTFAC)*RJ)
25       20 F(J,N)=S(L,N+8,J)
26       25 RETURN
27          END
```

```
 1  *DECK BCXOUT
 2        SUBROUTINE BCXOUT(L)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL BTRID
 6  *CALL VARS2
 7  C   IMPLICIT OUTFLOW BOUNDARY CONDITIONS IN XI DIRECTION
 8  C   FILL IN LAST ROW OF BLOCK TRIDIAGONAL COEFF MATRIX WITH
 9  C   EQUATION BETWEEN DELTAQ(JMAX) AND DELTAQ(JM).
10  C   EQUATION IS FIRST ORDER BACKWARD DIFFERENCING IN XI OF
11  C   THE P.D.E. AT J=JMAX.
12  C   RIGHT HAND SIDE OF EQUATION IS COMPUTED IN SUBR. RHS
13        J=JMAX
14        RJ=Q6(L,J)
15        RR=RM * (RJ+Q6(L,J-1))
16        DO 20 N=1,5
17        DO 15 M=1,5
18        A(J,N,M)=-2.0*D(J-1,N,M)
19     15 B(J,N,M)=2.0*D(J,N,M)
20        A(J,N,N)=A(J,N,N)-RR + (1.0-WTFAC)*RJ
21        B(J,N,N)=(WTFAC*RJ+RR)+B(J,N,N)
22     20 F(J,N)=S(L,N+8,J)
23        RETURN
24        END
```

```
      *DECK BTRI
            SUBROUTINE BTRI(IL,IU)
      *CALL BTRID
            DIMENSION H(5,5)
            REAL L11,L21,L22,L31,L32,L33,L41,L42,L43,L44,L51,L52,L53,L54,L55
            IS=IL+1
            IE=IU-1
      C     INSERT LUDEC
            L11=1./B(IL,1,1)
            L21=B(IL,2,1)
            U12=B(IL,1,2)*L11
            L22=1./(B(IL,2,2)-L21*U12)
            U13=B(IL,1,3)*L11
            U14 = B(IL,1,4)*L11
            U15=B(IL,1,5)*L11
            L31=B(IL,3,1)
            L32=B(IL,3,2)-L31*U12
            U23=(B(IL,2,3)-L21*U13)*L22
            L33=1./(B(IL,3,3)-U13*L31-U23*L32)
            U24=(B(IL,2,4)-L21*U14)*L22
            U25=(B(IL,2,5)-L21*U15)*L22
            L41=B(IL,4,1)
            L42=B(IL,4,2)-L41*U12
            L43=B(IL,4,3)-L41*U13-L42*U23
            U34=(B(IL,3,4)-L31*U14-L32*U24)*L33
            L44=1./(B(IL,4,4)-U14*L41-U24*L42-U34*L43)
            U35=(B(IL,3,5)-L31*U15-L32*U25)*L33
            L51=B(IL,5,1)
            L52=B(IL,5,2)-L51*U12
            L53=B(IL,5,3)-L51*U13-L52*U23
            L54=B(IL,5,4)-L51*U14-L52*U24-L53*U34
            U45=(B(IL,4,5)-L41*U15-L42*U25-L43*U35)*L44
            L55=1./(B(IL,5,5)-L51*U15-L52*U25-L53*U35-L54*U45)
      C     COMPUTE LITTLE R S
            D1=L11*F(IL,1)
            D2=L22*(F(IL,2)-L21*D1)
            D3=L33*(F(IL,3)-L31*D1-L32*D2)
            D4=L44*(F(IL,4)-L41*D1-L42*D2-L43*D3)
            D5=L55*(F(IL,5)-L51*D1-L52*D2-L53*D3-L54*D4)
      C     COMPUTE BIG R S
            F(IL,5)=D5
            F(IL,4)=D4-U45*D5
            F(IL,3)=D3-U34*F(IL,4)-U35*D5
            F(IL,2)=D2-U23*F(IL,3)-U24*F(IL,4)-U25*D5
            F(IL,1)=D1-U12*F(IL,2)-U13*F(IL,3)-U14*F(IL,4)-U15*D5
      C     COMPUTE C PRIME FOR FIRST ROW
            DO 10 M=1,5
            D1=L11*C(IL,1,M)
            D2=L22*(C(IL,2,M)-L21*D1)
            D3=L33*(C(IL,3,M)-L31*D1-L32*D2)
            D4=L44*(C(IL,4,M)-L41*D1-L42*D2-L43*D3)
            D5=L55*(C(IL,5,M)-L51*D1-L52*D2-L53*D3-L54*D4)
            B(IL,5,M)=D5
            B(IL,4,M)=D4-U45*D5
            B(IL,3,M) = D3-U34*B(IL,4,M)-U35*D5
            B(IL,2,M) = D2-U23*B(IL,3,M)-U24*B(IL,4,M)-U25*D5
         10 B(IL,1,M) = D1-U12*B(IL,2,M)-U13*B(IL,3,M)-U14*B(IL,4,M)-U15*D5
            DO 30 I=IS,IE
            IR=I-1
      C      COMPUTE B PRIME*BIGR
            DO 15 N=1,5
         15 F(I,N)=F(I,N)-A(I,N,1)*F(IR,1)-A(I,N,2)*F(IR,2)-A(I,N,3)*F(IR,3)
           1 -A(I,N,4)*F(IR,4)-A(I,N,5)*F(IR,5)
      C      COMPUTE B PRIME
            DO 20 M=1,5
            DO 20 N=1,5
         20 H(N,M)=B(I,N,M)-A(I,N,1)*B(IR,1,M)-A(I,N,2)*B(IR,2,M)-A(I,N,3)
           1 *B(IR,3,M)-A(I,N,4)*B(IR,4,M)-A(I,N,5)*B(IR,5,M)
      C     INSERT LUDEC AGAIN
            L11=1./H(1,1)
            L21=H(2,1)
            U12=H(1,2)*L11
            L22=1./(H(2,2)-L21*U12)
            U13=H(1,3)*L11
            U14=H(1,4)*L11
            U15=H(1,5)*L11
            L31=H(3,1)
            L32=H(3,2)-L31*U12
            U23=(H(2,3)-L21*U13)*L22
            L33=1./(H(3,3)-U13*L31-U23*L32)
            U24=(H(2,4)-L21*U14)*L22
            U25=(H(2,5)-L21*U15)*L22
            L41=H(4,1)
            L42=H(4,2)-L41*U12
            L43=H(4,3)-L41*U13-L42*U23
            U34=(H(3,4)-L31*U14-L32*U24)*L33
```

```
      L44=1./(H(4,4)-U14*L41-U24*L42-U34*L43)
      U35=(H(3,5)-L31*U15-L32*U25)*L33
      L51=H(5,1)
      L52=H(5,2)-L51*U12
      L53=H(5,3)-L51*U13-L52*U23
      L54=H(5,4)-L51*U14-L52*U24-L53*U34
      U45=(H(4,5)-L41*U15-L42*U25-L43*U35)*L44
      L55=1./(H(5,5)-L51*U15-L52*U25-L53*U35-L54*U45)
C     COMPUTE LITTLE R#S
      D1=L11*F(I,1)
      D2=L22*(F(I,2)-L21*D1)
      D3=L33*(F(I,3)-L31*D1-L32*D2)
      D4=L44*(F(I,4)-L41*D1-L42*D2-L43*D3)
      D5=L55*(F(I,5)-L51*D1-L52*D2-L53*D3-L54*D4)
C     COMPUTE BIG R#S
      F(I,5)=D5
      F(I,4)=D4-U45*D5
      F(I,3)=D3-U34*F(I,4)-U35*D5
      F(I,2)=D2-U23*F(I,3)-U24*F(I,4)-U25*D5
      F(I,1)=D1-U12*F(I,2)-U13*F(I,3)-U14*F(I,4)-U15*D5
C     COMPUTE C PRIMES
      DO 25 M=1,5
      D1=L11*C(I,1,M)
      D2=L22*(C(I,2,M)-L21*D1)
      D3=L33*(C(I,3,M)-L31*D1-L32*D2)
      D4=L44*(C(I,4,M)-L41*D1-L42*D2-L43*D3)
      D5=L55*(C(I,5,M)-L51*D1-L52*D2-L53*D3-L54*D4)
      B(I,5,M)=D5
      B(I,4,M)=D4-U45*D5
      B(I,3,M) = D3-U34*B(I,4,M)-U35*D5
      B(I,2,M) = D2-U23*B(I,3,M)-U24*B(I,4,M)-U25*D5
   25 B(I,1,M) = D1-U12*B(I,2,M)-U13*B(I,3,M)-U14*B(I,4,M)-U15*D5
   30 CONTINUE
      I=IU
      IR=I-1
C      COMPUTE B PRIME*BIG R FOR LAST ROW
      DO 35 N=1,5
   35 F(I,N)=F(I,N)-A(I,N,1)*F(IR,1)-A(I,N,2)*F(IR,2)-A(I,N,3)*F(IR,3)
     1 -A(I,N,4)*F(IR,4)-A(I,N,5)*F(IR,5)
C      COMPUTE B PRIME
      DO 40 M=1,5
      DO 40 N=1,5
   40 H(N,M)=B(I,N,M)-A(I,N,1)*B(IR,1,M)-A(I,N,2)*B(IR,2,M)-A(I,N,3)
     1 *B(IR,3,M)-A(I,N,4)*B(IR,4,M)-A(I,N,5)*B(IR,5,M)
      L11=1./H(1,1)
      L21=H(2,1)
      U12=H(1,2)*L11
      L22=1./(H(2,2)-L21*U12)
      U13=H(1,3)*L11
      U14=H(1,4)*L11
      U15=H(1,5)*L11
      L31=H(3,1)
      L32=H(3,2)-L31*U12
      U23=(H(2,3)-L21*U13)*L22
      L33=1./(H(3,3)-U13*L31-U23*L32)
      U24=(H(2,4)-L21*U14)*L22
      U25=(H(2,5)-L21*U15)*L22
      L41=H(4,1)
      L42=H(4,2)-L41*U12
      L43=H(4,3)-L41*U13-L42*U23
      U34=(H(3,4)-L31*U14-L32*U24)*L33
      L44=1./(H(4,4)-U14*L41-U24*L42-U34*L43)
      U35=(H(3,5)-L31*U15-L32*U25)*L33
      L51=H(5,1)
      L52=H(5,2)-L51*U12
      L53=H(5,3)-L51*U13-L52*U23
      L54=H(5,4)-L51*U14-L52*U24-L53*U34
      U45=(H(4,5)-L41*U15-L42*U25-L43*U35)*L44
      L55=1./(H(5,5)-L51*U15-L52*U25-L53*U35-L54*U45)
      D1=L11*F(I,1)
      D2=L22*(F(I,2)-L21*D1)
      D3=L33*(F(I,3)-L31*D1-L32*D2)
      D4=L44*(F(I,4)-L41*D1-L42*D2-L43*D3)
      D5=L55*(F(I,5)-L51*D1-L52*D2-L53*D3-L54*D4)
      F(I,5)=D5
      F(I,4)=D4-U45*D5
      F(I,3)=D3-U34*F(I,4)-U35*D5
      F(I,2)=D2-U23*F(I,3)-U24*F(I,4)-U25*D5
      F(I,1)=D1-U12*F(I,2)-U13*F(I,3)-U14*F(I,4)-U15*D5
      I=IU
   45 I=I-1
      IP=I+1
      DO 50 N=1,5
   50 F(I,N)=F(I,N)-F(IP,1)*B(I,N,1)-F(IP,2)*B(I,N,2)-F(IP,3)*B(I,N,3)-
     1 F(IP,4)*B(I,N,4)-F(IP,5)*B(I,N,5)
      IF (I.GT.IL) GO TO 45
      RETURN
```

```
174         END
```

```
      *DECK DIFFER
            SUBROUTINE DIFFER(RD, IMIN, IMAX, ISYMIN, ISYMAX)
      *CALL BTRID
            I1=IMIN+1
            I2=IMAX-1
            DO 100 N=1,5
            DO 100 I=I1,I2
        100 F(I,N)=RD*(C(I+1,N,1)-C(I-1,N,1))
            IF(ISYMIN.GT.0) GO TO 300
            DO 200 N=1,5
        200 F(IMIN,N)=2.0*RD*(C(I1,N,1)-C(IMIN,N,1))
            GO TO 500
        300 DO 400 N=1,5
        400 F(IMIN,N)=2.0*RD*C(I1,N,1)
            F(IMIN,ISYMIN)=0.0
        500 IF(ISYMAX.GT.0) GO TO 700
            DO 600 N=1,5
        600 F(IMAX,N)=2.0*RD*(C(IMAX,N,1)-C(I2,N,1))
            RETURN
        700 DO 800 N=1,5
        800 F(IMAX,N)=-2.0*RD*C(I2,N,1)
            IF(ISYMAX.LT.6) F(IMAX,ISYMAX)=0.0
            RETURN
            END
```

```
                NOZL3D - DJMET
 1  *DECK DJMET
 2        SUBROUTINE DJMET(J,L,XJ,YJ,ZJ)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL VARS2
 6        DX2 = .5/DX1
 7        FAC=1.0
 8        JP = J+1
 9        JR = J-1
10        IF(J.NE.1) GO TO 100
11  C     FORWARD DIFFERENCE
12        JR=J
13        FAC=2.0
14        GO TO 200
15    100 IF(J.NE.JMAX) GO TO 200
16  C     BACKWARD DIFFERENCE
17        JP=J
18        FAC=2.0
19    200 XJ = (X(JP)-X(JR))*DX2*FAC
20        YJ = (Y(L,7,JP)-Y(L,7,JR))*DX2*FAC
21        ZJ = (Z(L,8,JP)-Z(L,8,JR))*DX2*FAC
22        RETURN
23        END
```

NOZL3D - DJMET2

```
1   *DECK DJMET2
2         SUBROUTINE DJMET2(J,L,XJ)
3   *CALL BASE
4   *CALL VARS1
5   *CALL VARS2
6         DX2 = .5/DX1
7         FAC=1.0
8         JP = J+1
9         JR = J-1
10        IF(J.NE.1) GO TO 100
11  C     FORWARD DIFFERENCE
12        JR=J
13        FAC=2.0
14        GO TO 200
15    100 IF(J.NE.JMAX) GO TO 200
16  C     BACKWARD DIFFERENCE
17        JP=J
18        FAC=2.0
19    200 XJ = (X(JP)-X(JR))*DX2*FAC
20        RETURN
21        END
```

```
1  *DECK DKMET
2        SUBROUTINE DKMET(J,K,L,XK,YK,ZK)
3  *CALL BASE
4  *CALL VARS1
5  *CALL VARS2
6  C     INTERMEDIATE WALL IN K DIRECTION
7        IF(KPLANE.EQ.0) GO TO 100
8        XK=0.0
9        YK=1.0
10       ZK=0.0
11       RETURN
12   100 DY2 = .5/DY1
13       KP = K+1
14       KR = K-1
15       IF(KW.LE.0.OR.K.LT.KW.OR.K.GT.KW+1.OR.J.GT.JKW) GO TO 200
16       IF(LW.GT.0.AND.L.GT.LW) GO TO 200
17       IF(K.EQ.KW) GO TO 700
18       IF(K.EQ.KW+1) GO TO 500
19   200 IF(K.NE.1) GO TO 600
20 C     TEST FOR INTERMEDIATE WALL NORMAL TO K=1 SURFACE
21       IF(LW) 300,300,450
22   300 IF(JK1WL LE.J.AND.J.LE.JK1WU) GO TO 500
23 C     SYMMETRY
24   400 XK=0.0
25       ZK=0.0
26       YK=2.0*(Y(L,7,KP)-Y(L,7,K))*DY2
27       RETURN
28 C     TEST FOR WALL NORMAL TO K=1 SURFACE
29   450 IF(L-LW) 300,300,400
30 C     FOWARD DIFFERECNE
31   500 FAC=2.0
32       KR=K
33       GO TO 900
34   600 IF(K.NE.KMAX) GO TO 800
35       IF(KMAXBC.LT.3.OR.KMAXBC.GT.4) GO TO 700
36 C     SYMMETRY
37       XK=0.0
38       YK=0.0
39       ZK=0.0
40       IF(KMAXBC.EQ.3) YK=2.0*(Y(L,7,K)-Y(L,7,KR))*DY2
41       IF(KMAXBC.EQ.4) ZK=2.0*(Z(L,8,K)-Z(L,8,KR))*DY2
42       RETURN
43 C     BACKWARD DIFFERENCE
44   700 KP=K
45       FAC=2.0
46       GO TO 900
47 C     CENTRAL DIFFERENCE
48   800 FAC=1.0
49   900 XK=0.
50       YK=(Y(L,7,KP)-Y(L,7,KR))*DY2*FAC
51       ZK=(Z(L,8,KP)-Z(L,8,KR))*DY2*FAC
52       RETURN
53       END
```

```
1   *DECK DLMET
2         SUBROUTINE DLMET(J,K,L,XL,YL,ZL)
3   *CALL BASE
4   *CALL VARS1
5   *CALL VARS2
6         COMMON/AXISYM/LAXIS
7   C     INTERMEDIATE WALL IN L DIRECTION
8         DZ2 = .5/DZ1
9         LP = L+1
10        LR = L-1
11        IF(LW.LE.0.OR.L.LT.LW.OR.L.GT.LW+1.OR.J.GT.JLW) GO TO 100
12        IF(KW.GT.0.AND.K.GT.KW) GO TO 100
13        IF(L.EQ.LW) GO TO 700
14        IF(L.EQ.LW+1) GO TO 500
15    100 IF(L.NE.1) GO TO 600
16  C     AXIS OF SYMMETRY
17        IF(LAXIS.NE.1) GO TO 150
18        XL=0.0
19        YL=Y(LP,7,K)-Y(L,7,K)
20        ZL=Z(LP,8,K)-Z(L,8,K)
21        GO TO 999
22  C     TEST FOR INTERMEDIATE WALL NORMAL TO L=1 SURFACE
23    150 IF(KW) 200,200,400
24  C     TEST FOR WALL AT L=1
25    200 IF(JL1WL.LE.J.AND.J.LE.JL1WU) GO TO 500
26  C     SYMMETRY
27    300 XL=0.0
28        YL=0.0
29        ZL=2.0*(Z(LP,8,K)-Z(L,8,K))*DZ2
30        GO TO 999
31  C     TEST FOR WALL AT L=1
32    400 IF(K-KW) 200,200,300
33  C     FORWARD DIFFERENCE
34    500 LR=L
35        FAC=2.0
36        GO TO 900
37    600 IF(L.NE.LMAX) GO TO 800
38        IF(LMAXBC.LT.3.OR.LMAXBC.GT.4) GO TO 700
39  C     SYMMETRY
40        XL=0.0
41        YL=0.0
42        ZL=0.0
43        IF(LMAXBC.EQ.3) YL=2.0*(Y(L,7,K)-Y(LR,7,K))*DZ2
44        IF(LMAXBC.EQ.4) ZL=2.0*(Z(L,8,K)-Z(LR,8,K))*DZ2
45        GO TO 999
46  C     BACKWARD DIFFERENCE
47    700 LP=L
48        FAC=2.0
49        GO TO 900
50  C     CENTRAL DIFFERENCE
51    800 FAC=1.0
52    900 XL=0.
53        YL=(Y(LP,7,K)-Y(LR,7,K))*DZ2*FAC
54        ZL=(Z(LP,8,K)-Z(LR,8,K))*DZ2*FAC
55    999 RETURN
56        END
```

```
                NOZL3D - DTSW
 1  *DECK DTSW
 2        SUBROUTINE DTSW(IDT)
 3  *CALL BASE
 4  C     ROUTINE TO CHANGE DT, ETC. TO NEW DT  IDT=1
 5  C           OR TO CHANGE BACK TO OLD DT     IDT=2
 6        IF(IDT.EQ.2) GO TO 10
 7        DTOLD=DT
 8        SMUOLD=SMU
 9        DT=DT*DTFAC
10        SMU=SMU*DTFAC
11        IF(SMU.GT.0.8) SMU=0.8
12        IF(DT.GT.DTMAX) DT=DTMAX
13        GO TO 20
14     10 DT=DTOLD
15        SMU=SMUOLD
16     20 CONTINUE
17        HD = .5*DT
18        HDX = HD/DX1
19        HDY = HD/DY1
20        HDZ = HD/DZ1
21        RETURN
22        END
```

NOZL3D - DYZ

```
1   *DECK DYZ
2         SUBROUTINE DYZ
3   *CALL BTRID
4   *CALL RHSBCC
5         II=I+1
6         IF(I.EQ.3) II=1
7         DO 100 L=1,LORKMX
8         DO 100 N=1,5
9     100 F(L,N)=C(L,N,I)-C(L,N,II)
10        RETURN
11        END
```

```
      *DECK DYZBCX
            SUBROUTINE DYZBCX(ISW)
      *CALL BASE
      *CALL RHSBCC
      *CALL BTRID
      C     EVALUATE VISCOUS CROSS TERMS AT UPPER BOUNDARY KMAX(LMAX WHEN ISW=1,
      C     OR AT THE INNER SURFACE K=KW (L=LW) OF AN INTERNAL WALL WHEN ISW=2
            I1=I-1
            IF(I.EQ.1) I1=3
            L2=LORKMX
            IF(ISW.EQ.2) GO TO 300
            IF(KLMXBC.EQ.0) RETURN
      C     BOUNDARY AT K=KMAX(L=LMAX)
      C     WALL B.C.(LKMXBC=1),
      C     FREE STREAM BC(KLMXBC=2) OR OUTFLOW BC(KLMXBC=5)
         80 DO 90 L=1,L2
         90 F(L,1)=0.0
            DO 100 N=2,5
            DO 100 L=1,L2
        100 F(L,N)=2.0*(C(L,N,I)-C(L,N,I1))
            IF(ISW.EQ.2) RETURN
            IF(KLMXBC.EQ.3.OR.KLMXBC.EQ.4) GO TO 500
            RETURN
      C     INTERNAL WALL AT K=KW (L=LW)
        300 IF(J.GT.JKLW) RETURN
            IF(LORKW.GT.0) L2=LORKW
            GO TO 80
      C     SYMMETRY B.C. FOR VELOCITY COMPONENT NORMAL TO UPPER BOUNDARY
        500 DO 600 L=1,LORKMX
        600 F(L,KLMXBC)=0.0
            RETURN
            END
```

```
      *DECK DYZBC1
            SUBROUTINE DYZBC1(ISW)
      *CALL BASE
      *CALL RHSBCC
      *CALL BTRID
      C     EVALUATE VISCOUS CROSS TERMS AT A LOWER BDRY K=1 (L=1) WHEN ISW=1,
      C     OR AT THE OUTER SURFACE K=KW+1 (L=LW+1) OF AN INTERNAL WALL
      C     WHEN ISW=2
            L1=1
            IF(ISW.EQ.2) GO TO 100
            IF(KL1BC.EQ.0) RETURN
      C     BOUNDARY AT K=1(L=1)
            IF(J.LT.JKL1WL.OR.J.GT.JKL1WU) GO TO 300
        100 L2=LORKMX
            IF(LORKW.GT.0) L2=LORKW+ISW-1
      C     INTERNAL WALL
            IF(ISW.EQ.1) GO TO 150
            IF(J-JKLW) 150,150,110
        110 IF(L2.EQ.LORKMX) RETURN
            IF(J.GT.JLKW) RETURN
            L1=L2-1
      C     ADIABATIC WALL BC ON ENERGY EQUATION
        150 I1=I-1
            IF(I.EQ.1) I1=3
            DO 200 L=1,L2
            DO 190 N=1,4
        190 F(L,N)=0.
        200 F(L,5)=2.0*(C(L,5,I)-C(L,5,I1))
            IF(ISW.EQ.2) RETURN
        250 IF(L2.EQ.LORKMX) RETURN
            L1=L2+1
      C     SYM BC AT KL=1.AND.J.LT.JKL1WL.OR.J.GT.JKL1WU.AND.LK.GT.LORKW
        300 DO 500 L=L1,LORKMX
            DO 400 N=1,5
        400 F(L,N)=2.0*(C(L,N,2)-C(L,N,1))
        500 F(L,IW+2)=0.0
            RETURN
            END
```

```
      *DECK DZY
            SUBROUTINE DZY(KORL)
      *CALL RHSBCC
      *CALL BASE
      *CALL VARS1
      *CALL BTRID
      *CALL VISC
      *CALL VARS2
            DIMENSION SS(13,1),T(13)
            EQUIVALENCE(SS,A),(T(1),T1,B(1,5,1)),(T(2),T2),(T(3),T3),(T(4),T4)
           2,(T(5),T5),(T(6),T6),(T(7),T7),(T(8),T8),(T(9),T9),(T(10),T10)
           3,(T(11),T11),(T(12),T12),(T(13),T13)
      C     VISCOUS STRESSES( INNER FIRST DERIVATIVES) FOR VISCOUS CROSS
      C     TERMS IN A K,L PLANE
            IF(IW.EQ.2) GO TO 300
            K=KORL
            CALL ZZM(J,K,1,LMAX)
            DO 100 L=1,LMAX
            CALL YYM(J,L,K,K)
            DO 100 N=1,4
        100 XX(L,N)=YY(K,N)
            DO 200 L=1,LMAX
            DO 200 N=1,4
        200 YY(L,N)=XX(L,N)
            GO TO 600
        300 L=KORL
            CALL YYM(J,L,1,KMAX)
            DO 400 K=1,KMAX
            CALL ZZM(J,K,L,L)
            DO 400 N=1,4
        400 XX(K,N)=ZZ(L,N)
            DO 500 K=1,KMAX
            DO 500 N=1,4
            ZZ(K,N)=YY(K,N)
        500 YY(K,N)=XX(K,N)
        600 K=KORL
            QW=0.0
            DO 800 L=1,LORKMX
            LLL=L
            KKK=K
            IF(IW.EQ.2) LLL=K
            IF(IW.EQ.2) KKK=L
            RA = 1./Q(LLL,1,KKK)
            Q2 = (Q(LLL,2,KKK)**2 + Q(LLL,3,KKK)**2 + Q(LLL,4,KKK)**2)*RA
            TT= GD*(Q(LLL,5,KKK) - 0.5*Q2)*RA
            CALL VISCOF(TT,RMUE)
            RMUE=TT
            VNU = RMUE+TURMU(LLL,6,KKK)
            GKAP = RMUE+PRTR*TURMU(LLL,6,KKK)
            RJ = 1./Q6(LLL,KKK)
            G1=RJ*VNU
            DO 700 N=1,3
            G2=YY(L,N)*G1
            T(N)=ZZ(L,1)*G2
            T(N+3)=ZZ(L,2)*G2
        700 T(N+6)=ZZ(L,3)*G2
            U(L) = Q(LLL,2,KKK)*RA
            V(L) = Q(LLL,3,KKK)*RA
            W(L) = Q(LLL,4,KKK)*RA
            E(L) = Q(LLL,5,KKK)*RA-.5*(U(L)**2+V(L)**2+W(L)**2)
            SS(1,L)=T1+T5+T9
            SS(2,L)=SS(1,L)+T1/3.0
            SS(3,L)=T2-2./3.*T4
            SS(4,L)=T3-2./3.*T7
            SS(5,L)=SS(1,L)+T5/3.0
            SS(6,L)=T4-2./3.*T2
            SS(7,L)=T6-2./3.*T8
            SS(8,L)=SS(1,L)+T9/3.
            SS(9,L)=T7-2./3.*T3
            SS(10,L)=T8-2./3.*T6
            SS(11,L)=SS(6,L)*V(L)+SS(9,L)*W(L)
            SS(12,L)=SS(3,L)*U(L)+SS(10,L)*W(L)
            SS(13,L)=SS(4,L)*U(L)+SS(7,L)*V(L)
            SS(1,L)=GKPR*GKAP*SS(1,L)/VNU
        800 CONTINUE
            I=I+1
            IF(I.EQ.4) I=1
      C     LATERAL LIMIT OF INTERNAL AND LOWER WALLS
            KLWP=KORLW
            IF(KORLW.EQ.0) KLWP=KORLMX
            DO 1000 L=1,LORKMX
      C     CENTRAL DIFFERENCES AT INTERIOR POINTS
            NDIFAC=1
            L1=L+1
            L2=L-1
      C     ONE-SIDED DIFFERENCES AT BOUNDARY POINTS
```

```
 87 C     LOWER BOUNDARY L (K) =1
 88       IF(L.NE.1) GO TO 801
 89       L2=L
 90       NDIFAC=2
 91       GO TO 890
 92 C     UPPER BOUNDARY LMAX (KMAX)
 93   801 IF(L.NE.LORKMX) GO TO 805
 94       L1=L
 95       NDIFAC=2
 96       GO TO 890
 97 C     INTERNAL WALLS
 98 C     TEST FOR INTERNAL WALL NORMAL TO L (K) DIRECTION THAT WOULD DISRUPT
 99 C     CENTRAL DIFFERENCES IN THAT DIRECTION
100   805 IF(LORKW.EQ.0) GO TO 890
101       LKWP=LORKW+1
102       IF(L.NE.LORKW .AND.  L.NE.LKWP) GO TO 890
103 C     TEST FOR INTERNAL WALL PARALLEL TO L (K) DIRECTION
104       IF(KORLW) 850,850,810
105 C     ONE-SIDED DIFFERENCES AT UPPER EDGE OF THE INTERNAL WALL
106 C     PARALLEL TO L (K) DIRECTION
107   810 IF(L.NE.LKWP) GO TO 850
108       IF(J.GT.JKLW .OR. K.NE.KORLW .OR. K.NE.KORLW+1) GO TO 850
109       L2=L
110       NDIFAC=2
111       GO TO 890
112 C     ONE-SIDED DIFFERENCES ON FACES OF THE INTERNAL WALL NORMAL TO THE
113 C     L (K) DIRECTION
114   850 IF(K.GT.KLWP.OR. J.GT.JLKW) GO TO 890
115       IF(L.EQ.LORKW) L1=L
116       IF(L.EQ.LKWP) L2=L
117       NDIFAC=2
118   890 CONTINUE
119       DO 900 N=1,13
120   900 T(N)=SS(N,L)
121 C     DERIVATIVES
122       DU = U(L1)-U(L2)
123       DV = V(L1)-V(L2)
124       DW = W(L1)-W(L2)
125       DEI = E(L1)-E(L2)
126       DU2=(U(L1)**2-U(L2)**2)*0.5
127       DV2=(V(L1)**2-V(L2)**2)*0.5
128       DW2=(W(L1)**2-W(L2)**2)*0.5
129 C     BOUNDARY POINT DERIVATIVES
130       IF(L.NE.1) GO TO 930
131 C     LOWER BOUNDARY L (K)=1
132 C     TEST B.C. OPTIONS
133       IF(LK1BC) 980,980,910
134 C      TEST FOR LOWER WALL
135   910 IF(K.LE.KLWP .AND. J.GE.JLK1WL .AND. J.LE.JLK1WU) GO TO 990
136 C     SYMMETRY CONDITIONS OUTSIDE WALL REGION
137       IF(IW-1) 915,915,920
138 C     SYMMETRY PLANE Z=CONSTANT
139   915 DWFAC=1.0
140       DVFAC=0.0
141       GO TO 970
142 C     SYMMETRY PLANE Y=CONSTANT
143   920 DWFAC=0.0
144       DVFAC=1.
145       GO TO 970
146 C     UPPER BOUNDARY LMAX (KMAX)
147   930 IF(L.NE.LORKMX) GO TO 990
148 C     TEST B.C. OPTIONS
149       GO TO (980,990,980,920,915,980),LKMXBC+1
150 C     INTERNAL WALLS ARE TAKEN CARE OF BY ONE-SIDED DIFFERENCES AS
151 C     SET UP PREVIOUSLY
152 C     SYMMETRY CONDITIONS ON DERIVATIVES
153   970 DU=0.
154       DU2=0.
155       DV2=0.
156       DW2=0.
157       DEI=0.
158       DV=DV*DVFAC
159       DW=DW*DWFAC
160       GO TO 990
161 C     SET VISCOUS STRESSES TO ZERO
162   980 DO 985 N=1,5
163       C(L,N,1)=0.0
164   985 CONTINUE
165       GO TO 1000
166 C     CORRECTION FACTOR FOR ONE-SIDED DIFFERENCES
167   990 IF(NDIFAC.NE.2) GO TO 995
168       DU=DU*2.0
169       DV=DV*2.0
170       DW=DW*2.0
171       DU2=DU2*2.0
172       DV2=DV2*2.0
173       DW2=DW2*2.0
```

```
                NOZL3D - DZY
174         DEI=DEI*2.0
175       995 CONTINUE
176   C     COMPUTE VISCOUS STRESSES
177         C(L,1,I)=0.0
178         C(L,2,I)=T2*DU+T3*DV+T4*DW
179         C(L,3,I)=T6*DU+T5*DV+T7*DW
180         C(L,4,I)=T9*DU+T10*DV+T8*DW
181         C(L,5,I)=T1*DEI+T2*DU2+T5*DV2+T8*DW2+T11*DU+T12*DV+T13*DW
182      1000 CONTINUE
183         RETURN
184         END
```

```
1   *DECK DZYBC
2         SUBROUTINE DZYBC(K)
3   *CALL RHSBCC
4   *CALL BTRID
5   *CALL VISC
6         KLWP1=KORLW+1
7         IF(KORLW.EQ.0) KLWP1=KORLMX
8         L=LORKW+1
9         IF(J.LE.JLKW.AND.LORKW.GT.0.AND.K.LE.KLWP1) GO TO 200
10    100 L=1
11        IF(LK1BC.EQ.0) GO TO 500
12        IF(J.LT.JLK1WL.OR.J.GT.JLK1WU.OR.K.GT.KLWP1) GO TO 300
13  C     WALL BC FOR JLK1WL.LE.J.LE.JLK1WU FOR L=1(K=1)
14    200 C(L,1,I)=0.0
15        C(L,2,I)=2.0*(U(L+1)-U(L))
16        C(L,3,I)=2.0*(V(L+1)-V(L))
17        C(L,4,I)=2.0*(W(L+1)-W(L))
18        C(L,5,I)=2.0*(E(L+1)-E(L))
19        IF(L-1) 500,500,100
20  C     SYMMETRY BC FOR J.LT.JLK1WL.OR.J.GT.JLK1WU FOR L=1(K=1)
21    300 DO 400 N=1,5
22    400 C(1,N,I)=0.0
23        IF(IW.EQ.1) C(1,4,I)=2.0*(W(2)-W(1))
24        IF(IW.EQ.2) C(1,3,I)=2.0*(V(2)-V(1))
25    500 L=LORKW
26        IF(J.LE.JLKW.AND.LORKW.GT.0.AND.K.LE.KLWP1) GO TO 700
27    600 IF(LKMXBC.EQ.0.OR.LKMXBC.EQ.2.OR.LKMXBC.EQ.5) RETURN
28        L=LORKMX
29        IF(LKMXBC.NE.1) GO TO 800
30  C     WALL BC FOR L=LMAX(K=KMAX)
31    700 C(L,1,I)=0.0
32        C(L,2,I)=2.0*(U(L)-U(L-1))
33        C(L,3,I)=2.0*(V(L)-V(L-1))
34        C(L,4,I)=2.0*(W(L)-W(L-1))
35        C(L,5,I)=2.0*(E(L)-E(L-1))
36        IF(L.LT.LORKMX) GO TO 600
37        RETURN
38    800 DO 900 N=1,5
39    900 C(L,N,I)=0.0
40  C     REFLECTIVE SYM BC WHEN LMAX(KMAX) A PLANE PARALLEL TO XY(YZ) PLANE
41        IF(LKMXBC.EQ.3) C(L,3,I)=2.0*(V(L)-V(L-1))
42  C     REFLECTIVE SYM BC WHEN LMAX(KMAX) A PLANE PARALLEL TO XZ(XY) PLANE
43        IF(LKMXBC.EQ.4) C(L,4,I)=2.0*(W(L)-W(L-1))
44        RETURN
45        END
```

```
                NOZL3D - DZYDYZ
 1  *DECK DZYDYZ
 2        SUBROUTINE DZYDYZ(IWW,JJ)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL BTRID
 6  *CALL RHSBCC
 7  *CALL VARS2
 8  C     VISCOUS RIGHT HAND SIDE TERMS THAT CONTAIN CROSS DERIVATIVES
 9  C     IN THE K,L OR L,K DIRECTIONS
10        DRE = HD/(RE*DZ1*DY1*2.0)
11        IW=IWW
12        CALL SW
13        I=0
14        KLXP=KORLMX+1
15        J=JJ
16        KLWT=KORLW
17        IF(KORLW.EQ.0) KLWT=-5
18        DO 300 K=1,KLXP
19        IF(K.LT.KLXP) CALL DZY(K)
20        IF(K.EQ.1) GO TO 300
21        IF(K.EQ.2) CALL DYZBC1(1)
22        IF(K.GT.2.AND.K.LT.KLXP) CALL DYZ
23        IF(K.EQ.KLWT+2) CALL DYZBC1(2)
24        IF(K.EQ.KLXP) CALL DYZBCX(1)
25        IF(K.EQ.KLWT+1) CALL DYZBCX(2)
26        DO 200 L=1,LORKMX
27        LLL=L
28        KKK=K-1
29        IF(IW.EQ.2) KKK=L
30        IF(IW.EQ.2) LLL=K-1
31        DO 200 N = 2,5
32   200  S(LLL,N+8,KKK) = S(LLL,N+8,KKK)+F(L,N)*DRE
33   300  CONTINUE
34        RETURN
35        END
```

```
      *DECK DZZDYY
            SUBROUTINE DZZDYY(IWW,JJ)
      *CALL BASE
      *CALL VARS1
      *CALL BTRID
      *CALL RHSBCC
      *CALL VISC
      *CALL VARS2
      C     VISCOUS RIGHT HAND SIDE TERMS THAT CONTAIN ONLY UNIDIRECTIONAL
      C     DERIVATIVES IN EITHER THE K OR L DIRECTION.
            IW=IWW
            CALL SW
            LKWR=LORKW+1
            KLWR=KORLW+1
            GKPR = GAMMA/PR
            PRTR = PR/0.9
            DRE = HD/(RE*DZORDY**2)
            J=JJ
            DO 2000 K = KLORLL,KUORLU
            INTWAL=0
            IF(LORKW.GT.0.AND.J.LE.JLKW) INTWAL=1
            IF(KORLW.GT.0.AND.K.GE.KLWR) INTWAL=0
            IF(IW.EQ.2) GO TO 700
            CALL ZZM(J,K,1,LMAX)
            GO TO 900
        700 CALL YYM(J,K,1,KMAX)
            DO 800 N=1,4
            DO 800 L=1,KMAX
        800 ZZ(L,N)=YY(L,N)
      C     SPECIFY BOUNDARY CONDITION ON DIMENSIONLESS WALL HEAT TRANS-
      C   FER RATE QW, NORMALIZED BY RHOINF*CINF**3.
        900 QW=0.0
            QW=QW*SQRT(ZZ(1,1)**2 + ZZ(1,2)**2 + ZZ(1,3)**2)
            DO 1000 L = 1,LORKMX
            LLL=L
            KKK=K
            IF(IW.EQ.2) LLL=K
            IF(IW.EQ.2) KKK=L
            RA = 1./Q(LLL,1,KKK)
            Q2=(Q(LLL,2,KKK)**2 + Q(LLL,3,KKK)**2 + Q(LLL,4,KKK)**2)*RA
            TT = GD*(Q(LLL,5,KKK) - 0.5*Q2)*RA
            CALL VISCOF(TT,RMUE)
            VNU = RMUE+TURMU(LLL,6,KKK)
            GKAP = RMUE+PRTR*TURMU(LLL,6,KKK)
            RJ = 1./Q6(LLL,KKK)
            S0(L) = (ZZ(L,1)**2+ZZ(L,2)**2+ZZ(L,3)**2)*RJ
            S1(L) = (S0(L)+ZZ(L,1)**2/3.*RJ)*VNU
            S2(L) = (S0(L)+ZZ(L,2)**2/3.*RJ)*VNU
            S3(L) = (S0(L)+ZZ(L,3)**2/3.*RJ)*VNU
            S4(L) = (ZZ(L,1)*ZZ(L,2)/3.*RJ)*VNU
            S5(L) = (ZZ(L,1)*ZZ(L,3)/3.*RJ)*VNU
            S6(L) = (ZZ(L,2)*ZZ(L,3)/3.*RJ)*VNU
            S0(L) = S0(L)*GKPR*GKAP
            U(L) = Q(LLL,2,KKK)*RA
            V(L) = Q(LLL,3,KKK)*RA
            W(L) = Q(LLL,4,KKK)*RA
            E(L) = Q(LLL,5,KKK)*RA-.5*(U(L)**2+V(L)**2+W(L)**2)
       1000 CONTINUE
            R2=0.
            R3=0.
            R4=0.
            R5=0.
            DO 1100 L = 1,LMORKM
            L1 = L+1
            T1 = S1(L1)+S1(L)
            T2 = S2(L1)+S2(L)
            T3 = S3(L1)+S3(L)
            T4 = S4(L1)+S4(L)
            T5 = S5(L1)+S5(L)
            T6 = S6(L1)+S6(L)
            T16 = S0(L1)+S0(L)
            DU = U(L1)-U(L)
            DV = V(L1)-V(L)
            DW = W(L1)-W(L)
            DEI = E(L1)-E(L)
            F2 = T1*DU+T4*DV+T5*DW
            F3 = T4*DU+T2*DV+T6*DW
            F4 = T5*DU+T6*DV+T3*DW
      C     CONSERVATIVE DIFFERENCING OF VISCOUS STRESS WORK TERMS IN ENERGY EQ
            DU2=U(L1)**2-U(L)**2
            DV2=V(L1)**2-V(L)**2
            DW2=W(L1)**2-W(L)**2
            DUV=U(L1)*V(L1)-U(L)*V(L)
            DUW=U(L1)*W(L1)-U(L)*W(L)
            DVW=V(L1)*W(L1)-V(L)*W(L)
            F5=T16*DEI+(T1*DU2+T2*DV2+T3*DW2)*0.5+T4*DUV+T5*DUW+T6*DVW
```

```
                NOZL3D - DZZDYY
 87         F(L,1) = 0.
 88         F(L,2) = F2-R2
 89         F(L,3) = F3-R3
 90         F(L,4) = F4-R4
 91         F(L,5) = F5-R5
 92   C     VISCOUS TERMS IN ENERGY EQ LOWER SURFACES INTERMEDIATE WALL
 93         IF(INTWAL.EQ.0) GO TO 1040
 94         IF(L.EQ.LORKW) F(L,5)=-2.0*(R5+DZORDY*RE*QW)
 95    1040 R2 = F2
 96         R3 = F3
 97         R4 = F4
 98         R5 = F5
 99   C     VISCOUS TERMS IN ENERGY EQ UPPER SURFACES INTERMEDIATE WALL
100         IF(INTWAL.EQ.0) GO TO 1050
101         IF(L.EQ.LKWR) F(L,5)=2.0*(R5+DZORDY*RE*QW)
102    1050 CONTINUE
103         IF(L.GT.1) GO TO 1100
104         R21=R2
105         R31=R3
106         R41=R4
107         R51=R5
108    1100 CONTINUE
109   C     DEFINE VISCOUS RHS TERMS AT THE LOWER BOUNDARY L=1 FOR
110   C     LK1BC=1 (EITHER WALL OR SYMMETRY BC)
111         IF(LK1BC.EQ.0) GO TO 1300
112   C     TEST FOR INTERMEDIATE WALL NORMAL TO L=1 SURFACE
113         IF(KORLW) 1110,1110,1120
114   C     TEST FOR WALL AT L=1
115    1110 IF(JLK1WL.LE.J.AND.J.LE.JLK1WU) GO TO 1150
116   C     SYMMETRY
117         GO TO 1140
118   C     TEST FOR WALL AT L=1
119    1120 IF(K.LE.KORLW.AND.(JLK1WL.LE.J.AND.J.LE.JLK1WU)) GO TO 1150
120   C     VISCOUS TERMS AT SYMMETRY PLANE PORTION OF LOWER BDY L=1
121    1140 F(1,1)=0.0
122         F(1,2)=2.0*R21
123         F(1,3)=2.0*R31
124         F(1,4)=2.0*R41
125         F(1,5)=2.0*R51
126         F(1,5-IW)=0.0
127         GO TO 1300
128   C     ADIABATIC WALL BC AT WALL PORTION OF LOWER BDY L=1
129    1150 DO 1200 N=1,4
130    1200 F(1,N)=0.0
131         F(1,5)=2.0*(R51+DZORDY*RE*QW)
132    1300 CONTINUE
133   C     DEFINE VISCOUS RHS TERMS AT THE UPPER BOUNDARY L=LORKMX
134   C     FOR LKMXBC=1(WALL),2(FREESTREAM), OR 5(OUTFLOW).
135         DO 1400 N=1,5
136    1400 F(LORKMX,N)=0.0
137         IF(LKMXBC.EQ.5) GO TO 1500
138         IF(LKMXBC-3) 1450,1650,1650
139    1450 IF(LKMXBC-1) 1700,1600,1500
140    1500 F(LORKMX,2)=-2.0*R2
141         F(LORKMX,3)=-2.0*R3
142         F(LORKMX,4)=-2.0*R4
143         F(LORKMX,5)=-2.0*R5
144         GO TO 1700
145    1600 F(LORKMX,5)=-2.0*(R5+DZORDY*RE*QW)
146         GO TO 1700
147   C     DEFINE VISCOUS RHS TERMS AT THE UPPER BOUNDARY L=LORKMX WHEN THE
148   C     LATTER IS A SYMMETRY PLANE(LKMXBC=3 OR 4).
149    1650 F(LORKMX,1)=0.0
150         F(LORKMX,2)=-2.0*F2
151         F(LORKMX,3)=-2.0*F3
152         F(LORKMX,4)=-2.0*F4
153         F(LORKMX,5)=-2.0*F5
154         F(LORKMX,LKMXBC)=0.0
155    1700 CONTINUE
156         DO 1800 L = LLORKL,LUORKU
157         LLL=L
158         KKK=K
159         IF(IW.EQ.2) LLL=K
160         IF(IW.EQ.2) KKK=L
161         DO 1800 N = 1,5
162    1800 S(LLL,N+8,KKK) = S(LLL,N+8,KKK)+F(L,N)*DRE
163    2000 CONTINUE
164         RETURN
165         END
```

```
      *DECK EIGEN
            SUBROUTINE EIGEN(J)
      *CALL BASE
      *CALL VARS1
      *CALL VARS2
      C
      C  COMPUTE EIGENVALUES
      C
      C   IF CNBR INPUTED GT 0.0 & THEN DT IS SET FOR THAT COURANT NUMBER
      C   IF CNBR INPUTED EQ 0.0 &THE INPUTED DT IS USED AND THE MAXIMUM
      C   COURANT NUMBER IS FOUND
      C
            DO 10 L=LL,LU
            DO 10 K=KAL,KU
            CALL YYM(J,L,K,K)
            CALL ZZM(J,K,L,L)
            RR = 1./Q(L,1,K)
            U = Q(L,2,K)*RR
            V = Q(L,3,K)*RR
            W = Q(L,4,K)*RR
            SNDSP = SQRT(GD*(Q(L,5,K)*RR-.5*(U*U+V*V+W*W)))
            SIGB = ABS(YY(K,4)+U*YY(K,1)+V*YY(K,2)+W*YY(K,3))+SNDSP*SQRT(
           1  YY(K,1)**2+YY(K,2)**2+YY(K,3)**2)
            SIGC = ABS(ZZ(L,4)+U*ZZ(L,1)+V*ZZ(L,2)+W*ZZ(L,3))+SNDSP*SQRT(
           1  ZZ(L,1)**2+ZZ(L,2)**2+ZZ(L,3)**2)
            SIGBC = AMAX1(SIGB,SIGC)
            SIGBC=SIGBC/Q6(L,K)
            IF (SIGMAX.GE.SIGBC) GO TO 10
            JT = J
            KT = K
            LT = L
            SIGMAX = SIGBC
         10 CONTINUE
            IF (SIGMAX.GT.SIGJMX) GO TO 15
            SIGMAX=SIGJMX
            JT=JTJ
            KT=KTJ
            LT=LTJ
         15 CONTINUE
            IF (J.NE.JMAX) GO TO 35
            DXM = AMIN1(DX1,DY1,DZ1)
            IF (CNBR.LE.0.0) GO TO 25
            DT = CNBR*DXM/SIGMAX
            DTFAC=1.0
            HD = .5*DT
            HDX = HD/DX1
            HDY = HD/DY1
            HDZ = HD/DZ1
            WRITE (6,20)CNBR,JT,KT,LT,DT
         20 FORMAT(1H0,3HCN=,E20.10,3X,11H,AT J,K,L =,315,3X,25HTHE TIME STEP
           1IS RESET TO,E20.10)
         25 CONTINUE
            CNBR = DT*SIGMAX/DXM
            WRITE (6,30)JT,KT,LT,CNBR,SMU
         30 FORMAT(5X,30HJ,K,L, AND MAX COURANT NBR    ,315,E14.5,2X,4HSMU=
           1   1PE12.5)
            IGNCAL=IGNCAL-2
         35 CONTINUE
            RETURN
            END
```

```
1   *DECK EIGENJ
2         SUBROUTINE EIGENJ(K,L)
3   *CALL BASE
4   *CALL VARS1
5   *CALL VARS2
6   C
7   C  COMPUTE EIGENVALUES
8   C
9   C  IF CNBR INPUTED GT 0.0 & THEN DT IS SET FOR THAT COURANT NUMBER
10  C  IF CNBR INPUTED EQ 0.0 &THE INPUTED DT IS USED AND THE MAXIMUM
11  C  COURANT NUMBER IS FOUND
12  C
13        XJ4=0.0
14        DO 10 J = JB,JMAX
15        RR = 1./Q(L,1,J)
16        U = Q(L,2,J)*RR
17        V = Q(L,3,J)*RR
18        W = Q(L,4,J)*RR
19        XJ1=DXIDX(L,14,J)
20        XJ2=DXIDY(L,15,J)
21        XJ3=DXIDZ(L,16,J)
22        SNDSP = SQRT(GD*(Q(L,5,J)*RR-.5*(U*U+V*V+W*W)))
23        SIGA=ABS(XJ4+U*XJ1+V*XJ2+W*XJ3)+SNDSP*SQRT(XJ1**2+XJ2**2+XJ3**2)
24        SIGA=SIGA/Q6(L,J)
25        IF(SIGJMX.GE.SIGA) GO TO 10
26        JTJ= J
27        KTJ= K
28        LTJ= L
29        SIGJMX = SIGA
30     10 CONTINUE
31        RETURN
32        END
```

```
                NOZL3D - FILTRX
 1  *DECK FILTRX
 2        SUBROUTINE FILTRX(K,L,J1,J2)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL BTRID
 6  *CALL VARS2
 7        DIMENSION E(5,5)
 8        JA = J1+1
 9        JBB = J2-1
10        XXJ4=0.0
11        DO 15 J=J1,J2
12        R1 = DXIDX(L,14,J)*HDX
13        R2 = DXIDY(L,15,J)*HDX
14        R3 = DXIDZ(L,16,J)*HDX
15        R4 = XXJ4*HDX
16        CALL AMATRX(E,J,L,R1,R2,R3,R4)
17        DO 10 M=1,5
18        DO 10 N=1,5
19     10 D(J,N,M) = E(N,M)
20     15 CONTINUE
21        DO 30 J=JA,JBB
22        RJ = Q6(L,J)
23        RR = RM *.5*(RJ+Q6(L,J-1))
24        RF = RM *.5*(RJ+Q6(L,J+1))
25        DO 25 N=1,5
26        DO 20 M=1,5
27        A(J,N,M) = -D(J-1,N,M)
28        B(J,N,M) = 0.0
29     20 C(J,N,M) = D(J+1,N,M)
30        A(J,N,N) = A(J,N,N)-RR
31        B(J,N,N) = RJ+RF+RR
32        C(J,N,N) = C(J,N,N)-RF
33     25 F(J,N) = S(L,N+8,J)
34     30 CONTINUE
35        RETURN
36        END
```

```
 1  *DECK FILTRY
 2        SUBROUTINE FILTRY(J,L,K1,K2)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL BTRID
 6  *CALL VARS2
 7        DIMENSION E(5,5)
 8        KA = K1+1
 9        KB = K2-1
10        CALL YYM(J,L,K1,K2)
11        DO 15 K=K1,K2
12        R1 = YY(K,1)*HDY
13        R2 = YY(K,2)*HDY
14        R3 = YY(K,3)*HDY
15        R4 = YY(K,4)*HDY
16        CALL AMATRX(E,K,L,R1,R2,R3,R4)
17        DO 10 M=1,5
18        DO 10 N=1,5
19     10 D(K,N,M) = E(N,M)
20     15 CONTINUE
21        DO 30 K=KA,KB
22        RJ = Q6(L,K)
23        RR = RM * .5*(RJ+Q6(L,K-1))
24        RF = RM * .5*(RJ+Q6(L,K+1))
25        DO 25 N=1,5
26        DO 20 M=1,5
27        A(K,N,M) = -D(K-1,N,M)
28        B(K,N,M) = 0.0
29     20 C(K,N,M) = D(K+1,N,M)
30        A(K,N,N) = A(K,N,N)-RR
31        B(K,N,N) = RJ+RF+RR
32        C(K,N,N) = C(K,N,N)-RF
33     25 F(K,N) = S(L,N+8,K)
34     30 CONTINUE
35        RETURN
36        END
```

```
 1  *DECK FILTRZ
 2        SUBROUTINE FILTRZ(J,K,L1,L2)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL BTRID
 6  *CALL VARS2
 7        DIMENSION E(5,5)
 8        LA = L1+1
 9        LB = L2-1
10        CALL ZZM(J,K,L1,L2)
11        DO 15 L=L1,L2
12        R1 = ZZ(L,1)*HDZ
13        R2 = ZZ(L,2)*HDZ
14        R3 = ZZ(L,3)*HDZ
15        R4 = ZZ(L,4)*HDZ
16        CALL AMATRX(E,K,L,R1,R2,R3,R4)
17        DO 10 M=1,5
18        DO 10 N=1,5
19     10 D(L,N,M) = E(N,M)
20     15 CONTINUE
21        DO 30 L=LA,LB
22        RJ = Q6(L,K)
23        RR = RM *.5*(RJ+Q6(L-1,K))
24        RF = RM *.5*(RJ+Q6(L+1,K))
25        DO 25 N=1,5
26        DO 20 M=1,5
27        A(L,N,M) = -D(L-1,N,M)
28        B(L,N,M) = 0.0
29     20 C(L,N,M) = D(L+1,N,M)
30        A(L,N,N) = A(L,N,N)-RR
31        B(L,N,N) = RJ+RF+RR
32        C(L,N,N) = C(L,N,N)-RF
33     25 F(L,N) = S(L,N+8,K)
34     30 CONTINUE
35        RETURN
36        END
```

```
 1  *DECK FLUXVE
 2        SUBROUTINE FLUXVE(JK,L,R1,R2,R3,R4)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL VARS2
 6        RR = 1./Q(L,1,JK)
 7        U = Q(L,2,JK)*RR
 8        V = Q(L,3,JK)*RR
 9        W = Q(L,4,JK)*RR
10        QS = R4+R1*U+R2*V+R3*W
11        PP = GAM1*(Q(L,5,JK)-.5*Q(L,1,JK)*(U*U+V*V+W*W))
12        FV(1) = Q(L,1,JK)*QS
13        FV(2) = Q(L,2,JK)*QS+R1*PP
14        FV(3) = Q(L,3,JK)*QS+R2*PP
15        FV(4) = Q(L,4,JK)*QS+R3*PP
16        FV(5) = (Q(L,5,JK)+PP)*QS-R4*PP
17        RETURN
18        END
```

```
      *DECK GDINTF
            SUBROUTINE GDINTF(J,K1,K2,L1,L2,NMX,DINTGL)
      C     DOUBLE INTEGRAL OF FHAT OVER ETA(K) AND ZETA(L) BETWEEN
      C     LIMITS (K1,K2) AND (L1,L2)
      *CALL BASE
      *CALL VARS1
      *CALL BTRID
      *CALL VARS2
            DIMENSION DINTGL(5)
            DO 20 L=L1,L2
            DO 15 K=K1,K2
      C  METRICS XIX,XIY,XIZ
            M=K
            J1=J
            CALL XXM(L,J1,M,M)
            CALL FLUXVE(K,L,XX(K,1),XX(K,2),XX(K,3),0.)
            DO 10 N=1,NMX
         10 A(K,N,1)=FV(N)
         15 CONTINUE
            DO 20 N=1,NMX
            CALL QDRTR(B(L,N,1),A(1,N,1),DY1,K1,K2)
         20 CONTINUE
            DO 30 N=1,NMX
            CALL QDRTR(ENTGRL,B(1,N,1),DZ1,L1,L2)
         30 DINTGL(N)=ENTGRL
            RETURN
            END
```

```
1  *DECK GDINTW
2        SUBROUTINE GDINTW(IWW,JJ,LORKIN,KORL1,KORL2,ENDL,GFS)
3  *CALL BASE
4  *CALL VARS1
5  *CALL BTRID
6  *CALL RHSBCC
7  *CALL VARS2
8        DIMENSION GFS(5)
9  C     DOUBLE INTEGRAL OF TOTAL STRESS OVER A WALL BOUNDARY SURFACE
10 C     LORK= CONSTANT BETWEEN LIMITS (J1,J2) AND (KORL1,KORL2).
11       J=JJ
12       GKPR=GAMMA/PR
13       IW=IWW
14       L=LORKIN
15       NDD=1
16       CALL SW
17       IF(L.EQ.LORKW.OR.L.EQ.LORKMX) NDD=-NDD
18       L1=NDD
19       K1=0
20       IF(IW.EQ.1) GO TO 5
21       L1=0
22       K1=NDD
23     5 CONTINUE
24       DO 200 K=KORL1,KORL2
25       IF(IW-1) 10,10,20
26    10 CONTINUE
27       LORK=L
28       KORL=K
29       CALL ZZM(J,K,L,L)
30       GO TO 30
31    20 CONTINUE
32       LORK=K
33       KORL=L
34       CALL YYM(J,K,L,L)
35       DO 25 N=1,4
36    25 ZZ(L,N)=YY(L,N)
37    30 RA=1./Q(LORK,1,KORL)
38       Q2=(Q(LORK,2,KORL)**2+Q(LORK,3,KORL)**2+Q(LORK,4,KORL)**2)*RA
39       T=GD*(Q(LORK,5,KORL)-0.5*Q2)*RA
40       CALL VISCOF(T,RMUE)
41       VNU=RMUE
42       GKAP=RMUE
43 C     RECONSTRUCT GEOMETRIC JACOBIAN FROM VOLUME-AVERAGED ONE
44       Q6L=Q6(LORK,KORL)
45       Q6LP=Q6(LORK+L1,KORL+K1)
46       RJ=3./(4.*Q6L-Q6LP)
47       S0 = (ZZ(L,1)**2+ZZ(L,2)**2+ZZ(L,3)**2)
48       C(K,1,1)=SQRT(S0)
49       S0=S0*RJ
50       S1 = (S0+ZZ(L,1)**2/3.*RJ)*VNU
51       S2 = (S0+ZZ(L,2)**2/3.*RJ)*VNU
52       S3 = (S0+ZZ(L,3)**2/3.*RJ)*VNU
53       S4 = (ZZ(L,1)*ZZ(L,2)/3.*RJ)*VNU
54       S5 = (ZZ(L,1)*ZZ(L,3)/3.*RJ)*VNU
55       S6 = (ZZ(L,2)*ZZ(L,3)/3.*RJ)*VNU
56       R1=1.0/Q(LORK,1,KORL)
57       R2=1.0/Q(LORK+L1,1,KORL+K1)
58       R3=1.0/Q(LORK+2*L1,1,KORL+2*K1)
59       DU=(4.0*Q(LORK+L1,2,KORL+K1)*R2-3.0*Q(LORK,2,KORL)*R1-Q(LORK+2*L1,
60      1  2,KORL+2*K1)*R3)/(2.0*DZ1)
61       DV=(4.0*Q(LORK+L1,3,KORL+K1)*R2-3.0*Q(LORK,3,KORL)*R1-Q(LORK+2*L1,
62      1 3,KORL+2*K1)*R3)/ (2.0*DZ1)
63       DW=(4.0*Q(LORK+L1,4,KORL+K1)*R2-3.0*Q(LORK,4,KORL)*R1-Q(LORK+2*L1,
64      1 4,KORL+2*K1)*R3)/ (2.0*DZ1)
65       E1=(Q(LORK,5,KORL)-0.5*Q2)*RA
66       Q2=R2*(Q(LORK+L1,2,KORL+K1)**2+Q(LORK+L1,3,KORL+K1)**2+Q(LORK+L1,4
67      1  ,KORL+K1)**2)
68       E2=(Q(LORK+L1,5,KORL+K1)-0.5*Q2)*R2
69       Q2=R3*(Q(LORK+2*L1,2,KORL+2*K1)**2+Q(LORK+2*L1,3,KORL+2*K1)**2+
70      1 Q(LORK+2*L1,4,KORL+2*K1)**2)
71       E3=(Q(LORK+2*L1,5,KORL+2*K1)-0.5*Q2)*R3
72       DE=(4.0*E2-3.0*E1-E3)/(2.0*DZ1)
73       GFS(2)=S1*DU+S4*DV+S5*DW
74       GFS(3)=S2*DV+S4*DU+S6*DW
75       GFS(4)=S3*DW+S5*DU+S6*DV
76       GFS(5)=S0*GKPR*GKAP*DE
77       CALL FLUXVE(KORL,LORK,ZZ(L,1),ZZ(L,2),ZZ(L,3),0.)
78       DO 100 N=2,5
79 C     CORRECT FOR DIRECTIONALITY OF DU,DV,DW,DE
80       IF(LORKIN.EQ.LORKW.OR.LORKIN.EQ.LORKMX) GFS(N)=-GFS(N)
81   100 A(K,N,1)=FV(N)-GFS(N)/RE
82   200 CONTINUE
83       CALL QDRTR(ENDL,C,DY1,KORL1,KORL2)
84       DO 300 N=2,5
85       CALL QDRTR(GFS(N),A(1,N,1),DY1,KORL1,KORL2)
86   300 CONTINUE
```

```
      RETURN
      END
```

```
*DECK GLOANT
      SUBROUTINE GLOANT
*CALL BASE
C     CALCULATE AND WRITE GLOBAL PERFORMANCE PARAMETERS.
      CALL QDRTR(AREF,ENTGD,DX1,1,JMAX)
      DO 400 N=1,5
      CALL QDRTR(ENTGRL,ENTGD1(1,N),DX1,1,JMAX)
  400 GF(N)=ENTGRL
C   CHANGE SCALING OF NON-DIMENSIONAL GENERALIZED FORCE VECTOR GF(N)
C   TO REFERENCE VALUES OF INFLOW BOUNDARY MASS FLUX RHOINF*UINF*AREF,
C   DYNAMIC PRESSURE AREF* 5*RHOINF*UINF**2, AND KINETIC ENERGY
C   FLUX AREF*.5*RHOINF*UINF**3.
C   REFERENCE AREA NORMALIZED BY SQUARE OF REFERENCE LENGTH.
      AREF=1 0
      FACM=1.0/RMACH
      GF(1)=FACM*GF(1)/AREF
      GF(5)=FACM*GF(5)/AREF
      FACM=2.0*FACM*FACM/AREF
      DO 500 N=2,5
  500 GF(N)=FACM*GF(N)
      WRITE(3) NC,TAU,GF
      WRITE(6,600) GF
  600 FORMAT(///4X,67HGENERALIZED FORCES FROM DIRECT INTEGRATION OF WALL
     1 SURFACE STRESSES   /1P5E11.4)
      RETURN
      END
```

```
      *DECK GLOBL
            SUBROUTINE GLOBL(JJ)
      *CALL BASE
      *CALL VARS1
      *CALL RHSBCC
      *CALL BTRID
      *CALL GLOB
      *CALL VARS2
            DIMENSION DINTGL(5),ENTBL(5)
            DATA IFIRST/0/
      C     GLOBL PERFORMANCE PARAMETERS FROM INTEGRAL FORM OF STEADY STATE
      C     CONSERVATION LAWS.
      C     FREESTREAM CONDITIONS ASSUMED AT GRID POINT (J,K,L)=(1,1,LMAX)
            J=JJ
            NMX=5
            IF (IFIRST.EQ.1) GO TO 15
            IFIRST=1
            DO 10 IW=1,2
            DO 10 N=1,NMX
            DO 10 IJ=1,JMAX
            ENTB(IJ,N,IW)=0.
         10 CONTINUE
         15 CONTINUE
            IF (J.EQ.1.OR.J.EQ.JMAX) GO TO 20
            GO TO 70
      C     INTEGRAL OVER OUTFLOW BOUNDARY
         20 L1=1
            L2=LMAX
            K1=1
            K2=KMAX
            CALL GDINTF(J,K1,K2,L1,L2,NMX,DINTGL)
            DO 25 N=1,NMX
         25 GF(N)=DINTGL(N)
      C     CORRECT FOR INTERNAL WALL LW.GT.0
            IF (LW.EQ.0) GO TO 40
            L1=LW
            L2=LW+1
            K1=1
            K2=KMAX
            IF (KW.EQ.0) GO TO 30
            K2=KW+1
            IF (J.LE.JLW) GO TO 30
            IF (J.GT.JKW) GO TO 40
            K1=KW
         30 CALL GDINTF(J,K1,K2,L1,L2,NMX,DINTGL)
            DO 35 N=1,NMX
         35 GF(N)=GF(N)-DINTGL(N)
      C     CORRECT FOR INTERNAL WALL KW.GT.0
         40 IF (KW.EQ.0) GO TO 52
            IF (J.GT.JKW) GO TO 52
            K1=KW
            K2=KW+1
            L1=1
            L2=LMAX
            IF (LW.EQ.0) GO TO 45
            L2=LW
         45 CALL GDINTF(J,K1,K2,L1,L2,NMX,DINTGL)
            DO 50 N=1,NMX
         50 GF(N)=GF(N)-DINTGL(N)
         52 CONTINUE
            IF (J.NE.JMAX) GO TO 60
            DO 55 N=1,NMX
         55 DINJMX(N)=GF(N)
            GO TO 70
         60 DO 65 N=1,NMX
            DINJ1(N)=GF(N)
         65 CONTINUE
         70 CONTINUE
      C     INTEGRALS OVER FREESTREAM BOUNDARIES LORKMX WHEN LKMXBC=2 OR 5
            DO 105 IW=1,2
            CALL SW
            L=LORKMX
            IF (LKMXBC.NE.2.AND.LKMXBC.NE.5) GO TO 105
            DO 95 K=1,KORLMX
            GO TO (75,80),IW
         75 CONTINUE
            CALL ZZM(J,K,LMAX,LMAX)
            R1=ZZ(L,1)
            R2=ZZ(L,2)
            R3=ZZ(L,3)
            CALL FLUXVE(K,L,R1,R2,R3,0.)
            GO TO 85
         80 CONTINUE
            CALL YYM(J,K,KMAX,KMAX)
            R1=YY(L,1)
            R2=YY(L,2)
```

```
      R3=YY(L,3)
      CALL FLUXVE(L,K,R1,R2,R3,0.)
   85 CONTINUE
      DO 90 N=1,NMX
   90 A(K,N,1)=FV(N)
   95 CONTINUE
      DO 100 N=1,NMX
      CALL QDRTR(ENTB(J,N,IW),A(1,N,1),1.0,1,KORLMX)
  100 CONTINUE
  105 CONTINUE
C     SET SWITCH FOR WALL SURFACE INTEGRATION
      IGFSUR=1
      IF(IGFSUR.EQ.0) GO TO 300
      DO 150 N=2,5
      ENTB(J,N,1)=0.
      ENTB(J,N,2)=0.
      ENTD(J)=0.
      DINTGL(N)=0.
      DINJ1(N)=0.
  150 DINJMX(N)=0.
C     COMPUTE GF(2) TO GF(5) DIRECTLY FROM WALL SURFACE INTEGRATIONS
      K1=1
      K2=KMAX
      IF(KW.GT.0) K2=KW
      IF(JL1WU.EQ.0) GO TO 170
      IF(J.LT.JL1WL.OR.J.GT.JL1WU) GO TO 170
      IF(L1BC.NE.1) GO TO 170
      FAC=1.
      IF(J.EQ.JL1WL) GO TO 152
      IF(J.EQ.JL1WU) GO TO 152
      GO TO 155
  152 IF(J.EQ.1.OR.J.EQ.JMAX) GO TO 155
      FAC=.5
  155 CONTINUE
      CALL GDINTW(1,J,1,K1,K2,ENTDL,ENTBL)
      ENTD(J)=ENTDL
      DO 160 N=2,5
  160 ENTB(J,N,1)=ENTB(J,N,1)+ENTBL(N)*FAC
  170 IF(LMAXBC.NE.1) GO TO 180
      CALL GDINTW(1,J,LMAX,K1,K2,ENTDL,ENTBL)
      ENTD(J)=ENTD(J)+ENTDL
      DO 175 N=2,5
  175 ENTB(J,N,1)=ENTB(J,N,1)+ENTBL(N)
  180 IF(LW.EQ.0) GO TO 220
      IF(J.GT.JLW) GO TO 220
      FAC=1.
      IF(J.NE.JLW) GO TO 182
      IF(J.EQ.JMAX) GO TO 182
      FAC=.5
  182 CONTINUE
      CALL GDINTW(1,J,LW,K1,K2,ENTDL,ENTBL)
      ENTD(J)=ENTD(J)+ENTDL
      DO 185 N=2,5
  185 ENTB(J,N,1)=ENTB(J,N,1)+ENTBL(N)*FAC
      IF(K2.EQ.KW) K2=K2+1
      CALL GDINTW(1,J,LW+1,K1,K2,ENTDL,ENTBL)
      ENTD(J)=ENTD(J)+ENTDL
      DO 190 N=2,5
  190 ENTB(J,N,1)=ENTB(J,N,1)+ENTBL(N)*FAC
  220 L1=1
      L2=LMAX
      IF(LW.GT.0) L2=LW
      IF(JK1WU.EQ.0) GO TO 230
      IF(J.LT.JK1WL.OR.J.GT.JK1WU) GO TO 230
      IF(K1BC.NE.1) GO TO 230
      FAC=1.0
      IF(J.EQ.JK1WL.OR.J.EQ.JK1WU) GO TO 221
      GO TO 222
  221 IF(J.EQ.1.OR.J.EQ.JMAX) GO TO 222
      FAC=.5
  222 CONTINUE
      CALL GDINTW(2,J,1,L1,L2,ENTDL,ENTBL)
      ENTD(J)=ENTD(J)+ENTDL
      DO 225 N=2,5
  225 ENTB(J,N,1)=ENTB(J,N,1)+ENTBL(N)*FAC
  230 IF(KMAXBC.NE.1) GO TO 240
      CALL GDINTW(2,J,KMAX,L1,L2,ENTDL,ENTBL)
      ENTD(J)=ENTD(J)+ENTDL
      DO 235 N=2,5
  235 ENTB(J,N,1)=ENTB(J,N,1)+ENTBL(N)
  240 IF(KW.EQ.0) GO TO 300
      IF(J.GT.JKW) GO TO 300
      FAC=1.
      IF(J.NE.JKW)GO TO 242
      IF(J.EQ.JMAX) GO TO 242
      FAC=.5
  242 CONTINUE
```

```
      CALL GDINTW(2,J,KW,L1,L2,ENTDL,ENTBL)
      ENTD(J)=ENTD(J)+ENTDL
      DO 245 N=2,5
  245 ENTB(J,N,1)=ENTB(J,N,1)+ENTBL(N)*FAC
      IF(L2.EQ.LW) L2=L2+1
      CALL GDINTW(2,J,KW+1,L1,L2,ENTDL,ENTBL)
      ENTD(J)=ENTD(J)+ENTDL
      DO 250 N=2,5
  250 ENTB(J,N,1)=ENTB(J,N,1)+ENTBL(N)*FAC
  300 CONTINUE
      RETURN
      END
```

```
      *DECK GLOBAL
            SUBROUTINE GLOBAL(J)
      *CALL BASE
      *CALL VARS1
      *CALL BTRID
      *CALL GLOB
      *CALL VARS2
            GKPR = GAMMA/PR
            PRTR = PR/0.9
      C
      C     INTEGRAL OF GENERALIZED STRESSES OVER WALL BOUNDARY L=1 OR L=LMAX
      C
            L=1
            IF(LMAXBC.EQ.1) L=LMAX
            DO 200 K=1,KMAX
            CALL ZZM(J,K,L,L)
            RA = 1./Q(L,1,K)
            Q2 = (Q(L,2,K)**2 + Q(L,3,K)**2 + Q(L,4,K)**2)*RA
            T = GD*(Q(L,5,K) - 0.5*Q2)*RA
            CALL VISCOF(T,RMUE)
            VNU = RMUE
            GKAP = RMUE
      C     RECONTRUCT GEOMETRIC JACOBIAN FROM VOLUME-AVERAGED ONE
            Q6L=Q6(L,K)
            LP=L+1
            IF(L.EQ.LMAX) LP=L-1
            Q6LP=Q6(LP,K)
            RJ=3./(4.*Q6L-Q6LP)
         15 CONTINUE
            S0 = (ZZ(L,1)**2+ZZ(L,2)**2+ZZ(L,3)**2)
            C(K,1,1)=SQRT(S0)
            S0=S0*RJ
            S1 = (S0+ZZ(L,1)**2/3.*RJ)*VNU
            S2 = (S0+ZZ(L,2)**2/3.*RJ)*VNU
            S3 = (S0+ZZ(L,3)**2/3.*RJ)*VNU
            S4 = (ZZ(L,1)*ZZ(L,2)/3.*RJ)*VNU
            S5 = (ZZ(L,1)*ZZ(L,3)/3.*RJ)*VNU
            S6 = (ZZ(L,2)*ZZ(L,3)/3.*RJ)*VNU
            L1=L+1
            L2=L+2
            IF(L.NE.LMAX) GO TO 20
            L1=L-1
            L2=L-2
         20 CONTINUE
            R1=1.0/Q(L,1,K)
            R2=1.0/Q(L1,1,K)
            R3=1.0/Q(L2,1,K)
            DU=(4.0*Q(L1,2,K)*R2-3.0*Q(L,2,K)*R1-Q(L2,2,K)*R3)/(2.0*DZ1)
            DV=(4.0*Q(L1,3,K)*R2-3.0*Q(L,3,K)*R1-Q(L2,3,K)*R3)/(2.0*DZ1)
            DW=(4.0*Q(L1,4,K)*R2-3.0*Q(L,4,K)*R1-Q(L2,4,K)*R3)/(2.0*DZ1)
            E1=(Q(L,5,K)-0.5*Q2)*RA
            Q2=R2*(Q(L1,2,K)**2+Q(L1,3,K)**2+Q(L1,4,K)**2)
            E2=(Q(L1,5,K)-0.5*Q2)*R2
            Q2=R3*(Q(L2,2,K)**2+Q(L2,3,K)**2+Q(L2,4,K)**2)
            E3=(Q(L2,5,K)-0.5*Q2)*R3
            DE=(4.0*E2-3.0*E1-E3)/(2.0*DZ1)
            GF(1)=0.0
            GF(2)=S1*DU+S4*DV+S5*DW
            GF(3)=S2*DV+S4*DU+S6*DW
            GF(4)=S3*DW+S5*DU+S6*DV
            GF(5)=S0*GKPR*GKAP*DE
            CALL FLUXVE(K,L,ZZ(L,1),ZZ(L,2),ZZ(L,3),0.)
            DO 100 N=1,5
      C     CORRECT FOR DIRECTIONALITY OF DU,DV,DW,DE
            IF(L.EQ.LMAX) GF(N)=-GF(N)
        100 A(K,N,1)=FV(N)-GF(N)/RE
        200 CONTINUE
            CALL QDRTR(ENTGD(J),C,DY1,1,KMAX)
            DO 300 N=1,5
            CALL QDRTR(ENTGDI(J,N),A(1,N,1),DY1,1,KMAX)
        300 CONTINUE
            RETURN
            END
```

```
      *DECK GLOINT
            SUBROUTINE GLOINT
      *CALL BASE
      *CALL GLOB
            NMX=5
            IF(IGFSUR.EQ.0) GO TO 10
            NMX=1
            CALL QDRTR(AREF,ENTD,DX1,1,JMAX)
            DO 5 N=2,5
            CALL QDRTR(ENTGRL,ENTB(1,N,1),DX1,1,JMAX)
          5 GF(N)=-ENTGRL
      C     NET OUTFLOW INTEGRAL MINUS INFLOW INTEGRAL
         10 DO 15 N=1,NMX
            GF(N)=-DINJMX(N)+DINJ1(N)
         15 CONTINUE
            DO 25 IW=1,2
            DO 20 N=1,NMX
            CALL QDRTR(ENTGRL,ENTB(1,N,IW),DX1,1,JMAX)
         20 GF(N)=GF(N)-ENTGRL
         25 CONTINUE
      C     CHANGE SCALING OF GENERALIZED FORCE VECTOR GF(N)
      C     TO REFERENCE VALUES OF INFLOW BOUNDARY MASS FLUX
      C     RRHO*RMACH, DYNAMIC PRESSURE .5*RRHO*RMACH**2, AND
      C     KINETIC ENERGY FLUX .5*RRHO*RMACH**3.  REFERENCE AREA
      C     IS EQUAL TO SQUARE OF REFERENCE LENGTH.
            AREF=1.0
            FACM=1.0/RMACH
            GF(1)=FACM*GF(1)/AREF
            GF(5)=FACM*GF(5)
            FACM=2.0*FACM*FACM/AREF
            DO 30 N=2,5
         30 GF(N)=FACM*GF(N)
            WRITE (6,35)GF,CW
         35 FORMAT(4X,3HGF=1P5E11.4,2X,3HCW=1PE11.4)
            RETURN
            END
```

NOZL3D - GRID

```
1  *DECK GRID
2        SUBROUTINE GRID
3  *CALL BASE
4  *CALL VARS1
5  *CALL VARS2
6  C     PUT HERE THE CALCULATION OF THE GRID
7        RETURN
8        END
```

```
1  *DECK INFLTR
2        SUBROUTINE INFLTR(ISW,LORK)
3  *CALL BASE
4  *CALL BTRID
5  *CALL RHSBCC
6  C     FILTER INTERMEDIATE DELTAQ AT INFLOW BOUNDARY
7        J=1
8        I1=2
9        IW=4-ISW
10       CALL SW
11 C     FILTER IN LORK DIRECTION
12       I2=LMORKM
13       IF(LORKW.GT.0) I2=LORKW-1
14       I3=I1-1
15       I4=I2+1
16       DO 30 N=1,5
17       IF(N.EQ.3.OR.N.EQ.4) GO TO 30
18       DO 10 I=I1,I2
19    10 A(I,1,1)=0.25*(F(I+1,N)+F(I-1,N)+2.0*F(I,N))
20       A(1,1,1)=F(1,N)
21       A(I2+1,1,1)=F(I2+1,N)
22       IF(LK1BC.EQ.1.AND.J.GE.JLK1WL.AND.J.LE.JLK1WU) GO TO 15
23       A(1,1,1)=0.5*(F(1,N)+F(2,N))
24    15 IF(I2.EQ.LMORKM.AND.(LKMXBC.EQ.3.OR.LKMXBC.EQ.4))
25      1  A(I2+1,1,1)=0.5*(F(I2,N)+F(I2+1,N))
26       DO 20 I=I3,I4
27    20 F(I,N)=A(I,1,1)
28    30 CONTINUE
29       DO 40 I=I3,I4
30       IF(IW.EQ.1) F(I,3)=VOU(I,LORK)*F(I,2)
31       IF(IW.EQ.2) F(I,3)=VOU(LORK,I)*F(I,2)
32       IF(IW.EQ.1) F(I,4)=WOU(I,LORK)*F(I,2)
33       IF(IW.EQ.2) F(I,4)=WOU(LORK,I)*F(I,2)
34    40 CONTINUE
35       RETURN
36       END
```

```
      *DECK INITIA
            SUBROUTINE INITIA
      *CALL BASE
      *CALL VARS1
      *CALL SHOCKC
      *CALL BTRID
      *CALL VISCO
      *CALL GLOB
      C     COMMON FREESP CONTAINS FREESTREAM PRESSURE
            COMMON/FREESP/FSP,FSRHO
            COMMON/AXISYM/LAXIS
            COMMON/FILTR/INFLT
      *CALL VARS2
            DIMENSION DINTGL(1)
            DIMENSION IDPARS(4)
      C     NOL MUST EQUAL THE FIRST DIMENSION OF Q (MULTIPLE OF 4 FOR CDC)
            NOL=32
            IDPARS(1)=0
            IDPARS(2)=0
            IDPARS(3)=0
            IDPARS(4)=0
            CALL DMHAS(3,0,0)
            CALL DMDAST(13,0,IDPARS)
            PI = 4.*ATAN(1.)
            NC1=0
            TAU=0.0
            NRES=1
            NK=0
      C
      C  READ DATA
      C
            READ (5,10)NMAX,JMAX,KMAX,LMAX,LAMIN,INVISC,J1BC,JMAXBC,KPLANE,K1B
           1C,JK1WL,JK1WU,KW,JKW,KMAXBC
            READ (5,10)L1BC,JL1WL,JL1WU,LW,JLW,LMAXBC,NRST,IWRIT,NGRI,NP,KVIS
           1,LVIS,KLVIS,INFLT,ISUTH,NROUT
            READ (5,15)DT,FSMACH,RMACH,RE,PR,RTDEGK,FSP,FST
            READ (5,15)GAMMA,RMUEXP,TW,CNBR,DTFAC,RM,SMU,OMEGA
            READ (5,15) DTMAX
         10 FORMAT(16I5)
         15 FORMAT(8F10.0)
            WRITE (6,20)NMAX,JMAX,KMAX,LMAX,LAMIN,INVISC,J1BC,JMAXBC,KPLANE,K1
           1BC,JK1WL,JK1WU,KW,JKW,KMAXBC
            WRITE (6,25)L1BC,JL1WL,JL1WU,LW,JLW,LMAXBC,NRST,IWRIT,NGRI,NP,KVIS
           1,LVIS,KLVIS,INFLT,ISUTH,NROUT
            WRITE (6,30)DT,FSMACH,RMACH,RE,PR,RTDEGK,FSP,FST
            WRITE (6,35)GAMMA,RMUEXP,TW,CNBR,DTFAC,RM,SMU,OMEGA
            WRITE(6,37) DTMAX
         20 FORMAT(1H1,22H0    NMAX    JMAX    KMAX    LMAX    LAMIN   INVISC   J1
           1BC    JMAXBC  KPLANE   K1BC    JK1WL   JK1WU    KW      JKW    KMAXB
           1C     /1618)
         25 FORMAT(//,32H     L1BC    JL1WL   JL1WU    LW      JLW    LMAXBC
           1 NRST   IWRIT   NGRI     NP      KVIS    LVIS   KLVIS   INFLT   IS
           2UTH    NROUT     /1618)
         30 FORMAT(//7X,2HDT,10X,6HFSMACH,10X,5HRMACH
           1,12X,2HRE,13X,2HPR,11X,6HRTDEGK,10X,3HFSP,13X,3HFST,/1P8E15.7)
         35 FORMAT(//5X,5HGAMMA,10X,6HRMUEXP,11X,2HTW,12X,4HCNBR,10X,5HDTFAC,
           1,13X,2HRM,12X,3HSMU,11X,5HOMEGA/1P8E15.7)
         37 FORMAT(//5X,5HDTMAX/1PE15.7///)
      C     RMACH IS REFERENCE MACH NUMBER
      C     RE IS REYNOLD'S NUMBER AT REFERENCE CONDITIONS
      C      RTDEGK IS REFERENCE TEMPERATURE IN DEGREES KELVIN
      C        (USED ONLY IN COMPUTING THE SUTHERLAND VISCOSITY)
      C     FSMACH IS FREESTREAM MACH NUMBER
      C       FSP IS DIMENSIONLESS FREESTREAM PRESSURE
      C       (NORMALIZED BY REFERENCE PRESSURE)
      C     FST IS DIMENSIONLESS FREESTREAM TEMPERATURE
      C        (NORMALIZED BY REFERENCE TEMPERATURE)
      C     INVISC=1 FOR INVISCID FLOW, 0 FOR VISCOUS FLOW
      C        (0 IS MANDATORY)
      C     LAMIN=1 FOR LAMINAR FLOW, 0 FOR TURBULENT FLOW
      C
      C     SET BOUNDARY CONDITION OPTIONS KPLANE=1 FOR PLANAR SYMMETRY
      C     LMAXBC DEFINES BDY CONDITIONS AT THE SURFACE L=LMAX.  THE BC ARE H
      C     FIXED AT THEIR INITIAL VALUES FOR LMAXBC=0.
      C     LMAXBC=1 SELECTS IMPLICIT VISCOUS WALL BC
      C     LMAXBC=2 SELECTS IMPLICIT OUTFLOW BC WITH ENFORCED FREESTREAM
      C              PRESSURE,FREESTREAM DENSITY
      C     LMAXBC=3 SELECTS REFLECTIVE SYMMETRY BC SUCH THAT LMAX IS A
      C              SYMMETRY PLANE Z=CONSTANT AND THE
      C              W-VELOCITY COMPONENT IS ZERO IN THAT SYMMETRY PLANE.
      C     LMAXBC=4 SELECTS REFLECTIVE SYMMETRY BC SUCH THAT LMAX IS A
      C              SYMMETRY PLANE Y=CONSTANT AND THE V
      C              VELOCITY COMPONENT IS ZERO IN THAT SYMMETRY PLANE.
      C     LMAXBC=5 SELECTS IMPLICIT OUTFLOW BC IN WHICH ALL VISCOUS STRESSES
      C              AND HEAT FLUXEX VANISH AT L=LMAX.
      C    NOTE LMAXBC = 0 CAN BE USED TO EMPLOY TIME-LAGGED BDRY CONDITIONS
```

```
C    AT LMAX, WHICH CAN BE CODED INTO SUBR. BC.  SIMILARLY TIME-LAGGED BC
C      AT THE OTHER BDYS L=1,K=1,K=KMAX CAN BE CONSTRUCETD WHEN L1BC,K1BC
C      OR KMAXBC ARE ZERO.
C
C      L1BC DEFINES THE BC AT THE SURFACE L=1
C      L1BC=0 MEANS THE BC ARE HELD FIXED AT THEIR INITIAL VALUES.
C      L1BC=1 MEANS IMPLICIT VISCOUS WALL BC ARE APPLIED IN THE WALL
C             REGION(JL1WL.LE.J.LE.JL1WU) AND (1.LE.K.LE.KMAX).
C      THE REMAINDER OF THE SURFACE L=1 OUTSIDE THIS WALL REGION IS
C      ASSUMED TO COINCIDE WITH THE Z=0 PLANE, AND REFLECTIVE SUMMETRY BC
C       ARE APPLIED SUCH THAT THE W-COMPONENT OF VELOCITY VANISHES IN
C      THE SYMMETRY PLANE.  WHEN KW.GT.0(SEE BELOW), THE DESCRBED WALL
C      REGION EXTENDS OUT ONLY TO K=KW RATHER THAN KMAX.
C
C      KMAXBC DEFINES THE BC AT THE SURFACE K=KMAX.  THE OPTIONS ARE
C             IDENTICAL TO THOSE FOR LMAXBC
C
C      K1BC DEFINES THE BC AT THE SURFACE K=1
C      K1BC=0 MEANS THE BC ARE HELD FIXED AT THEIR INITIAL VALUES.
C      K1BC=1 MEANS IMPLICIT VISCOUS WALL BC ARE APPLIED IN THE WALL
C             REGION(JK1WL.LE.J.LE.JK1WU) AND (1.LE.L.LE.LMAX).
C      THE REMAINDER OF THE SURFACE K=1 OUTSIDE THIS WALL REGION IS
C      ASSUMED TO COINCIDE WITH THE Y=0 PLANE, AND REFLECTIVE SUMMETRY BC
C       ARE APPLIED SUCH THAT THE V-COMPONENT OF VELOCITY VANISHES IN
C      THE SYMMETRY PLANE.  WHEN LW.GT.0(SEE BELOW), THE DESCRBED WALL
C      REGION EXTENDS OUT ONLY TO L=LW RATHER THAN LMAX.
C
C      TW=0.0 SELECTS IMPLICIT ADIABATIC WALL BC FOR THE ENERGY EQUATION.
C         A NON-ZERO INPUT VALUE OF TW IMPOSES A BOUNDARY CONDITION ON
C         DIMENSIONLESS ABSOLUTE WALL TEMPERATURE EQUAL TO TW.
       ITW=0
       IF(TW.GT.0.0) ITW=1
C
C    SET OPTIONS FOR INFLOW (J=1) AND OUTFLOW(J=JMAX) BOUNDARIES
C    JMAXBC=2 FOR SUBSONIC OUTFLOW WITH FREESTREAM PRESSURE IMPOSED
C    JMAXBC.LT.2 FOR COMPUTED OUTFLOW B.C.
C    J1BC=0 FOR FIXED (LAGGED) B.C. AT J=1.  J1BC.NE.0 USES INITIAL
C    VALUES OF TOTAL PRESSURE, TOTAL ENTHALPY, AND VELOCITY VECTOR
C    DIRECTION COSINES, TOGETHER WITH A CLOSING EQUATION OBTAINED EITHER
C    FROM MOC THEORY(J1BC.LT.0) OR FROM THE CONTINUITY, U-MOMENTUM,OR
C    ENERGY EQUATION(J1BC.GT.0). SEE COMMENTS IN SUBR. BCJMAT
C
C    KVIS = 1(0) SPECIFIES THAT THE VISCOUS TERMS FOR THE ETA(K)
C    DIRECTION ARE TO BE INCLUDED IN (OMITTED FROM) THE COMPUTATION.
C    LVIS = 1(0) SIMILARLY CONTROLS THE COMPUTATION OF THE VISCOUS
C    TERMS FOR THE ZETA(L) COORDINATE DIRECTION
C    KLVIS = 1(0) SIMILARLY CONTROLS THE COMPUTATION OF THE VISCOUS
C    CROSS DERIVATIVE TERMS FOR THE ETA AND ZETA COORDINATE DIRECTIONS.
C
C    SET NORMAL MASS INJECTION RATE WMDOT,NORMALIZED BY (FREESTREAM
C    DENSITY)*(FREESTREAM SOUND SPEED)
       WMDOT =0.0
C    SET FINITE VOL/FINITE-DIFF WEIGHT FACTOR, WTFAC=0.75(1.0) FOR
C    FINITE-VOL (FINITE-DIFF) WEIGHTING OF DELTAQ AT BDY POINTS.
C      WTFAC=0.75 IS MANDATORY
C
       INXBC=1
       WTFAC=0.75
       NPLOT=0
       IPLOT1=0
       IPLOT2=0
       CNBR=0.0
       IF(KPLANE.EQ.1) KMAX=1
       NLROW=16*NOL
       NKLP=KMAX*NLROW
       NLSKIP=NKLP-NLROW
       CF = 1.05
       NC=NC1
       ITMAX=NC1+NMAX
       IGNCAL=2
       SM0=0.5*SMU/(8.0*(3.0-FLOAT(KPLANE)))
       JB=2
       IF(J1BC.NE.0) JB=1
       LL=2
       IF(L1BC.GT.0) LL=1
       LU=LMAX-1
       IF(LMAXBC.GT.0) LU=LMAX
       IF(KPLANE.EQ.1) KMAXBC=0
       IF(KPLANE.EQ.1) K1BC=0
       KAL=2
       IF(K1BC.GT.0) KAL=1
       KU=KMAX-1
       IF(KMAXBC.GT.0) KU=KMAX
       IF(KPLANE.EQ.1) KU=1
       IF(KPLANE.EQ.1) KAL=1
C  COMPUTE CONSTANTS
       FSRHO=FSP/FST
```

```
174         ALP=0.
175         TSUTH=110.33/RTDEGK
176         GAM1 = GAMMA-1
177         GD = GAMMA*GAM1
178         HD = .5*DT
179         JM = JMAX-1
180         KM = KMAX-1
181         IF(KPLANE.EQ.1) KM=1
182         KL2=2
183         IF(KPLANE.EQ.1) KL2=1
184         LM = LMAX-1
185         DX1 = 1.
186         DY1 = 1.
187         DZ1 = 1.
188         HDX = HD/DX1
189         HDY = HD/DY1
190         HDZ = HD/DZ1
191         CS = COS(P1*ALP/180.)
192         SS = SIN(P1*ALP/180.)
193         CWFAC=(2./(GAMMA+1.))**(.5*(GAMMA+1.)/(GAMMA-1.))
194   C...FILL ZETA COORDINATE ARRAY
195   C       DO 1  K = 1,KMAX
196   C       CALL ETATB(ZET(1,K),CF,LMAX)
197   C     1 CONTINUE
198   C
199   C
200   C       INITIALIZE SHOCK GRID POINT VELOCITIES
201         DO 40 J=1,JMAX
202         DO 40 K=1,KMAX
203         XST(J,K)=0.0
204         YST(J,K)=0.0
205         ZST(J,K)=0.0
206      40 CONTINUE
207   C  LOAD FREE STREAM AT ANGLE OF ATTACK ALP WHERE ALP IS
208   C  MEASURED FROM X AXIS IN X,Y PLANE
209         READ(2) KMAXR,JMAXR,LMAXR,ITMAXR,LMAXBC,L1BC,FSMACH,GAMMA,RE,SMUR,
210        1                                          DTR,ALP,CNBR,PRR
211         WRITE (6,45)KMAXR,JMAXR,LMAXR,ITMAXR,LMAXBC,L1BC,FSMACH,GAMMA,RE,S
212        1MUR,DTR,ALP,CNBR,PRR
213      45 FORMAT(5X,55HTHIS IS A RESTART FROM THE FOLLOWING INITIAL CONDITIO
214        1NS                          /76H  KMAXR,JMAXR,LMAXR,ITMAXR,LMAXBC,
215        1L1BC,FSMACH,GAMMA,RE,SMUR,DTR,ALP,CNBR,PRR   /6I10/8E15.8)
216         CNBR=0.0
217         WRITE(3)KMAX,JMAX,LMAX,ITMAX,LMAXBC,L1BC,FSMACH,GAMMA,RE,SMU,DT,
218        1                                                      ALP,CNBR,PR
219         WRITE(4)KMAX,JMAX,LMAX,ITMAX,LMAXBC,L1BC,FSMACH,GAMMA,RE,SMU,DT,
220        1                                                      ALP,CNBR,PR
221   C...RESTART
222      50 READ(2) NC1,TAU,DTR,NK
223         IF (NC1.GT.NRST) GO TO 160
224         IF (NC1.EQ.NRST) GO TO 60
225         DO 55 J=1,JMAXR
226      55 READ(2) DUM
227         GO TO 50
228      60 DO 100 J=1,JMAX
229         DO 65 K=1,KMAX
230         DO 65 L=1,LMAX
231            Q(L,1,K) = 1.0
232            Q(L,2,K) = FSMACH*CS
233            Q(L,3,K) = 0.0
234            Q(L,4,K) = FSMACH*SS
235            Q(L,5,K) =1./GD+.5*FSMACH**2
236      65    CONTINUE
237         READ(2) (((Q(L,N,K),L=1,LMAXR),N=1,8),K=1,KMAXR)
238         IF(NGRI.EQ.1) CALL GRID(J)
239   C     SAVE X
240         X(J)=Q(1,6,1)
241   C     PUT DXIDX ON DISK FOR INITIAL JACOBIAN CALCULATION
242         DO 70 L=1,LMAX
243         CALL XYM(L,J,1,KMAX)
244         DO 70 K=1,KMAX
245         DXIDX(L,14,K)=XX(K,1)
246      70 CONTINUE
247   C     ZERO OUT TURMU
248         DO 95 L=1,LMAX
249         DO 95 K=1,KMAX
250      95 TURMU(L,6,K)=0.0
251         CALL LKPIO(J,1)
252     100 CONTINUE
253   C     SWITCH TO IDENTIFY AXIAL SYMMETRY
254         LAXIS=0
255         IF(KPLANE.EQ.0.AND. ABS(Y(1,7,1)-Y(1,7,KMAX)).LT.1.E-6) LAXIS=1
256   C     FIND NOZZLE THROAT INDEX J=JTT
257         JTT=1
258         DO 102 J=1,JMAX
259         IF(X(J).NE.0.) GO TO 102
260         JTT=J
```

```
      GO TO 103
  102 CONTINUE
  103 CONTINUE
C     REDEFINE FSMACH AS DIMENSIONLESS FREESTREAM VELOCITY
C     (NORMALIZED BY REFERENCE SOUND SPEED)
      FSMACH=FSMACH*SQRT(FST)
      RE = RE/RMACH
C     I/O LJ-PLANES TO PUT Q6,YX1,ZX1 ON DISC FOR CALC. Q6 IN JACOB
      DO 115 K=1,KMAX
      CALL LJPIO(K,2)
      DO 110 L=1,LMAX
      DO 105 J=1,JMAX
      CALL DJMET(J,L,XX(J,1),YXI(L,15,J),ZXI(L,16,J))
      Q(L,14,J)=XX(J,1)*DXIDX(L,14,J)
  105 CONTINUE
  110 CONTINUE
      CALL LJPIO(K,1)
  115 CONTINUE
C
      CALL OUTALL(NC1)
C
      DO 155 J=1,JMAX
      CALL LKPIO(J,2)
      DO 120 L=1,LMAX
      DO 120 K=1,KMAX
      Q6(L,K)=Q(L,14,K)
      CALL DJMET2(J,L,XXI(L,14,K))
  120 CONTINUE
      CALL JACOB(J)
      IF(J.NE.JMAX) GO TO 124
C
C      ADJUST OUTFLOW PLANE VARIABLES TO SATISFY IMPOSED PRESSURE
C      BOUNDARY CONDITION P=FSP WHEN JMAXBC=2
C
      IF(JMAXBC.NE.2) GO TO 124
      DO 122 L=1,LMAX
      DO 122 K=1,KMAX
      RV=Q(L,2,K)**2+Q(L,3,K)**2+Q(L,4,K)**2
      POLD=GD*(Q(L,5,K)-RV/(2.*Q(L,1,K)))
      PNEW=FSP/POLD
      Q(L,1,K)=PNEW*Q(L,1,K)
      Q(L,5,K)=FSP/GD+RV/(2.*Q(L,1,K))
  122 CONTINUE
  124 CONTINUE
      CALL BC(J)
      CALL GLOBL(J)
      IF (J.NE.JTT) GO TO 90
C     COMPUTE NOZZLE THROAT AREA
      KT=KMAX
      IF(KW.GT.0) KT=KW
      LT=LMAX
      IF(LW.GT.0) LT=LW
      DO 80 L=1,LT
      CALL XXM(L,J,1,KT)
      DO 75 K=1,KT
      DA=SQRT(XX(K,1)*XX(K,1)+XX(K,2)*XX(K,2)+XX(K,3)*XX(K,3))
   75 A(K,1,1)=DA
      CALL QDRTR(B(L,1,1),A(1,1,1),DY1,1,KT)
   80 CONTINUE
      CALL QDRTR(AT,B(1,1,1),DZ1,1,LT)
      IF(AT.LT.1.E-6) AT=1.
      WRITE (6,85)JTT,AT
   85 FORMAT(2X,28HTHROAT LOCATION X=0. AT JTT=  13/
     1  2X,15HTHROAT AREA AT=  1PE12.5)
   90 CONTINUE
      IF (J.NE.JTT) GO TO 125
C     NOZZLE DISCHARGE COEFFICIENT CW
C     INTEGRATE MASS FLOW AT THROAT J=JT
      NMX=1
      L1=1
      L2=LMAX
      IF(LW.GT.0) L2=LW
      K1=1
      K2=KMAX
      IF(KW.GT.0) K2=KW
      CALL GDINTF(J,K1,K2,L1,L2,NMX,DINTGL)
      CW=DINTGL(1)/(CWFAC*AT)
  125 CONTINUE
      CALL PRECAL(J)
      DO 130 L=1,LMAX
      DO 130 K=1,KMAX
      Q(L,15,K)=Q6(L,K)
  130 CONTINUE
C
C   COMPUTE HTOT AND PTOT (REFERENCED TO HREF AND PREF, RESP.), AND
C   VELOCITY VECTOR DIRECTION COSINES VOU=V/U, WOU=W/U AT INFLOW
C   BOUNDARY J=1.
```

```
348  C
349        IF (J.GT.1) GO TO 150
350        IF (J1BC.EQ.0.AND.INXBC.EQ.0) GO TO 150
351        DO 140 K=1,KMAX
352        DO 140 L=1,LMAX
353        RR=1.0/Q(L,1,K)
354        XKE=0.5*(Q(L,2,K)**2 + Q(L,3,K)**2 + Q(L,4,K)**2)*RR**2
355        ER=Q(L,5,K)*RR
356        HTOT(L,K)=GAMI*(GAMMA*ER-GAMI*XKE)
357        PTOT(L,K)=HTOT(L,K)*Q(L,1,K)*(GAMMA*GAMI*(ER-XKE)/
358       1                                                HTOT(L,K))**(-1.0/GAMI)
359        IF (Q(L,2,K).NE.0.0) GO TO 135
360        VOU(L,K)=1.0/SQRT(RE*FSMACH)
361        WOU(L,K)=1.0/SQRT(RE*FSMACH)
362        VOU(L,K)=0.
363        WOU(L,K)=0.
364        GO TO 140
365   135  VOU(L,K)=Q(L,3,K)/Q(L,2,K)
366        WOU(L,K)=Q(L,4,K)/Q(L,2,K)
367   140  CONTINUE
368        WRITE (6,145)((L,VOU(L,1),WOU(L,1),HTOT(L,1),PTOT(L,1)),L=1,LMAX)
369   145  FORMAT(5X,3HK=1/6X,1HL,8X,3HVOU,12X,3HWOU,11X,4HHTOT,
370       1  10X,4HPTOT/(5X,I2,1P4E15.7))
371   150  CONTINUE
372        CALL LKPIO(J,1)
373   155  CONTINUE
374        RETURN
375   160  WRITE (6,165)NC1,NRST
376   165  FORMAT(30H  ***ERROR - INPUT VALUE NRST= I5,60H DOES NOT MATCH ANY
377       1 RESTART CYCLE NUMBER.  LAST CYCLE READ =   I5)
378        STOP
379        END
```

```
*DECK JACOB
      SUBROUTINE JACOB(JDO)
*CALL BASE
*CALL VARS1
*CALL RHSBCC
*CALL VARS2
      COMMON/AXISYM/LAXIS
      IWW=2
      IF(KPLANE.EQ.1) IWW=1
      J=JDO
      AFAC= 75
      BFAC=.25
C     UPPER BOUNDARY SURFACE L=LORKMX
      DO 35 IW=1,IWW
      CALL SW
      IF(LKMXBC.NE.1) GO TO 35
      L=LORKMX
      IF(L.EQ.1) GO TO 35
      DO 30 K=1,KORLMX
      IF(IW.EQ.1) Q6(L,K)=AFAC*Q6(L,K)+BFAC*Q6(L-1,K)
      IF(IW.EQ.2) Q6(K,L)=AFAC*Q6(K,L)+BFAC*Q6(K,L-1)
   30 CONTINUE
   35 CONTINUE
      IF(LAXIS.EQ.0) GO TO 40
C     AXIAL SYMMETRY AT L=1 FOR ALL K,J
      DO 37 K=1,KMAX
      Q6(1,K)=AFAC*Q6(1,K)+BFAC*Q6(2,K)
   37 CONTINUE
   40 CONTINUE
C     LOWER BOUNDARY SURFACE LORK=1
      L=1
      DO 55 IW=1,IWW
      CALL SW
      IF(J.LT.JLK1WL) GO TO 55
      IF(J.GT.JLK1WU) GO TO 55
      IF(KORLW.EQ.0) KLIM=KORLMX
      IF(KORLW.GT.0) KLIM=KORLW
      DO 50 K=1,KLIM
      IF(IW.EQ.1) Q6(L,K)=AFAC*Q6(L,K)+BFAC*Q6(L+1,K)
      IF(IW.EQ.2) Q6(K,L)=AFAC*Q6(K,L)+BFAC*Q6(K,L+1)
   50 CONTINUE
   55 CONTINUE
C     INTERIOR AND EXTERIROR SURFACES OF AN INTERNAL WALL AT L =LORKW
      DO 70 IW=1,IWW
      CALL SW
      IF(J.GT.JLKW) GO TO 70
      IF(LORKW.LE.0) GO TO 70
      IF(KORLW.EQ.0) KLIM=KORLMX
      IF(KORLW.GT.0) KLIM=KORLW+1
      L=LORKW
      DO 60 K=1,KLIM
      IF(IW.EQ.1) Q6(L,K)=AFAC*Q6(L,K)+BFAC*Q6(L-1 K)
      IF(IW.EQ.2) Q6(K,L)=AFAC*Q6(K,L)+BFAC*Q6(K,L-1)
      IF(IW.EQ.1) Q6(L+1,K)=AFAC*Q6(L+1,K)+BFAC*Q6(L+2,K)
      IF(IW.EQ.2) Q6(K,L+1)=AFAC*Q6(K,L+1)+BFAC*Q6(K,L+2)
   60 CONTINUE
   70 CONTINUE
C     EXTERIOR EDGE WHERE TWO INTERNAL WALLS INTERSECT WHEN BOTH WALLS
C     ARE PRESENT AND ONE WALL IS LONGER THAN THE OTHER
      IF(KPLANE.EQ.1) GO TO 100
      DO 90 IW=1,2
      CALL SW
      IF(KORLW.LE.0) GO TO 90
      IF(LORKW.LE.0) GO TO 90
      IF(J.LT.JLKW+1) GO TO 90
      IF(J.GT.JKLW) GO TO 90
      L=LORKW
      KS=KORLW+1
      DO 80 K=KORLW,KS
      IF(IW.EQ.1) Q6(L,K)=AFAC*Q6(L,K)+BFAC*Q6(L+1,K)
      IF(IW.EQ.2) Q6(K,L)=AFAC*Q6(K,L)+BFAC*Q6(K,L+1)
   80 CONTINUE
   90 CONTINUE
  100 CONTINUE
C     WRITE(6,900) J
C 900 FORMAT(5X,'J=',I4)
C     WRITE(6,905)
C 905 FORMAT(3X,'K'T15'1'T30'2'T45'3'T60'4'T75'5'T90'6'T105'7'
C    1  T120'8')
C     DO 110 K=1,KMAX
C     WRITE(6,910) K,(Q6(I,K),I=1,8)
C 110 CONTINUE
C     WRITE(6,906)
C 906 FORMAT(3X,'K'T15'9'T30'10'T45'11'T60'12'T75'13'T90'14'T105'15')
C     DO 115 K=1,KMAX
C     WRITE(6,910) K,(Q6(I,K),I=9,15)
```

```
C 910 FORMAT(2X,I2,1X,1P8E15.8)
C 115 CONTINUE
      RETURN
      END
```

```
 1  *DECK LJPIO
 2        SUBROUTINE LJPIO(K,N)
 3  *CALL VARS1
 4  *CALL BASE
 5  *CALL VARS2
 6        CALL DMPAST(13,(K-1)*NLROW,1)
 7        DO 10 J=1 ,JMAX
 8        IF(N.EQ.1)  CALL DMWAST(13,Q(1,1,J),NLROW)
 9        IF(N.EQ.2)  CALL DMRAST(13,Q(1,1,J),NLROW)
10        CALL DMPAST(13,NLSKIP,-1)
11     10 CONTINUE
12        RETURN
13        END
```

```
 1  *DECK LKPIO
 2        SUBROUTINE LKPIO(J,N)
 3  *CALL VARS1
 4  *CALL BASE
 5  *CALL VARS2
 6        CALL DMPAST(13,(J-1)*NKLP,1)
 7        IF(N.EQ.1)  CALL DMWAST(13,Q,NKLP)
 8        IF(N.EQ.2)  CALL DMRAST(13,Q,NKLP)
 9        RETURN
10        END
```

```
      *DECK MUTMIX
            SUBROUTINE MUTMIX(L1,L2)
      *CALL BASE
      *CALL VARS1
            COMMON/VISC/TAS(32),UU(32),SNOR(32),TMO(32),TMI(32),TURMT(32),
           1   DS(32),U(32),V(32),W(32),E(32),RR(32)
      *CALL VARS2
      C     TURBULENT KINEMATIC VISCOSITY FOR MIXING LAYER AND FULLY DEVELOPED
      C     JET REGION
      C     CALCULATE MAXIMUM VORTICITY AND VELOCITY EXTREMA
            TASMAX=1.E-5
            UMAX=UU(L1)
            UMIN=UU(L1)
            LMIN=L1+1
            DO 1 L=LMIN,L2
            IF(TAS(L).GT.TASMAX) TASMAX=TAS(L)
            IF(UU(L).GT.UMAX) UMAX=UU(L)
            IF(UU(L).LT.UMIN) UMIN=UU(L)
          1 CONTINUE
      C     CALCULATE TURBULENT VISCOSITY
            DO 10 L=L1,L2
            IF(TASMAX) 4,4,6
          4 TURMT(L)=0
            GO TO 10
      C     MIXING LENGTH
          6 ELMIX=0.13*ABS(UMAX-UMIN)/TASMAX
      C     KINEMATIC VISCOSITY OVER RE
            TURMT(L)=(ELMIX**2)*TAS(L)
         10 CONTINUE
            RETURN
            END
```

```
 1  *DECK MUTSPF
 2        SUBROUTINE MUTSPF(IW,LORK,J,KORL,SPFAC)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL VARS2
 6  C     COMPUTE EXPONENT SPFAC IN EXPONENTIAL DAMPING FACTOR FOR
 7  C     BOUNDARY LAYER ON A WALL AT L(K)=LORK
 8        GO TO (10,20),IW
 9     10 L=LORK
10        K=KORL
11        GO TO 30
12     20 L=KORL
13        K=LORK
14     30 RM1=1./Q(L,1,K)
15        XKE=.5*(Q(L,2,K)**2+Q(L,3,K)**2+Q(L,4,K)**2)*RM1
16        TT=GD*(Q(L,5,K)-XKE)*RM1
17        CALL VISCOF(TT,RMUE)
18        SPFAC=SQRT(RE*Q(L,1,K)/RMUE)
19        RETURN
20        END
```

```
      *DECK MUTUR
            SUBROUTINE MUTUR(JJ)
      *CALL BASE
      *CALL VARS1
      *CALL RHSBCC
            COMMON/VISC/TAS(32),UU(32),SNOR(32),TMO(32),TMI(32),TURMT(32),
           1   DS(32),U(32),V(32),W(32),E(32),RR(32)
      *CALL VARS2
            COMMON/AXISYM/LAXIS
            DATA IFIRST/0/
            IFIRST=IFIRST+1
      C
      C     CONTROL ROUTINE FOR TURBULENT VISCOSITY TURMU(L,6,K)
      C
            J=JJ
            IF(J.LT.JB) GO TO 3000
            DO 2500 IW=1,2
            IF(KPLANE.EQ.1.AND.IW.EQ.2) GO TO 2500
            IF(LAXIS.EQ.1.AND.KPLANE.EQ.0.AND.IW.EQ.2) GO TO 2500
            CALL SW
            DO 2000 K=KLORLL,KUORLU
         10 DO 20 L=LLORKL,LUORKU
            GO TO (1,2),IW
          1 LORK=L
            KORL=K
      C     ETA METRICS
            CALL YYM(J,L,K,K)
            E(L)=1./SQRT(YY(K,1)**2+YY(K,2)**2+YY(K,3)**2)
            GO TO 3
          2 LORK=K
            KORL=L
      C     ZETA METRICS
            CALL ZZM(J,L,K,K)
            E(L)=1./SQRT(ZZ(K,1)**2+ZZ(K,2)**2+ZZ(K,3)**2)
      C     VELOCITY COMPONENTS, TOTAL VELOCITY, AND ELEMENTAL ARC
      C     LENGTH ALONG LORK LINE
          3 RHOI=1./Q(LORK,1,KORL)
            U(L)=RHOI*Q(LORK,2,KORL)
            V(L)=RHOI*Q(LORK,3,KORL)
            W(L)=RHOI*Q(LORK,4,KORL)
            UU(L)=SQRT(U(L)**2+V(L)**2+W(L)**2)
            GO TO (6,7),IW
          6 CALL DLMET(J,K,L,XI,YI,ZI)
            GO TO 8
          7 CALL DKMET(J,L,K,XI,YI,ZI)
          8 DS(L)=SQRT(XI**2+YI**2+ZI**2)
         20 CONTINUE
      C     VORTICITY COMPONENT NORMAL TO SURFACE ETA=CONSTANT OR ZETA=CONSTANT
            DO 999 L=LLORKL,LUORKU
            GO TO (31,32),IW
         31 LORK=L
            KORL=K
            D2=.5/DZI
            GO TO 33
         32 LORK=K
            KORL=L
            D2=.5/DYI
      C     XI METRICS
         33 XJ=XXI(L,14,K)
            YJ=YXI(L,15,K)
            ZJ=ZXI(L,16,K)
      C     DERIVATIVES OF VELOCITY COMPONENTS IN LORK DIRECTION
            LP=L+1
            LR=L-1
      C     INTERMEDIATE WALL IN LORK DIRECTION
            IF(LORKW.LE.0.OR.L.LT.LORKW.OR.L.GT.LORKW+1.OR.J.GT.JLKW)GO TO 100
            IF(KORLW.GT.0.AND.K.GT.KORLW) GO TO 100
            IF(L.EQ.LORKW) GO TO 700
            IF(L.EQ.LORKW+1) GO TO 500
        100 IF(L.NE.1) GO TO 600
            IF(LAXIS.NE.1) GO TO 150
            DU=0.
            DV=V(LP)-V(L)
            DW=W(LP)-W(L)
            GO TO 910
        150 CONTINUE
      C     TEST FOR INTERMEDIATE WALL NORMAL TO L=1 SURFACE
            IF(KORLW) 200,200,400
      C     TEST FOR WALL AT L=1
        200 IF(JLKIWL.LE.J.AND.J.LE.JLKIWU) GO TO 500
      C     SYMMETRY
        300 DU=0.0
            IF(IW.EQ.2) GO TO 310
            DV=0.0
            DW=W(LP)-W(L)
            GO TO 910
```

```
  310 DV=V(LP)-V(L)
      DW=0.
      GO TO 910
C     TEST FOR WALL AT L=1
  400 IF(K-KORLW) 200,200,300
C     FORWARD DIFFERENCE
  500 LR=L
      FAC=2.0
      GO TO 900
  600 IF(L.NE.LORKMX) GO TO 800
      IF(LKMXBC.LT.3.OR.LKMXBC.GT.4) GO TO 700
C     SYMMETRY
      DU=0.0
      DV=0.0
      DW=0.0
      LR=LR
      IF(LKMXBC.EQ.4) DW=W(L)-W(LR)
      IF(LKMXBC.EQ.3) DV=V(L)-V(LR)
      GO TO 910
C     BACKWARD DIFFERENCE
  700 LP=L
      FAC=2.0
      GO TO 900
C     CENTRAL DIFFERENCE
  800 FAC=1.0
  900 LR=LR
      LP=LP
      DU=(U(LP)-U(LR))*D2*FAC
      DV=(V(LP)-V(LR))*D2*FAC
      DW=(W(LP)-W(LR))*D2*FAC
  910 CONTINUE
C     VORTICITY COMPONENT
      TAS(L)=ABS(XJ*DU+YJ*DV+ZJ*DW)*E(L)
  999 CONTINUE
C     COMPUTE TURBULENT KINEMATIC VISCOSITY OVER RE,TURMT(L), ALONG THE
C     CURRENT LORK LINE AND STORE TEMPORARILY IN S(KL,IW,J)
C
C     CONFIGURATIONS WITHOUT INTERMEDIATE WALLS (PURE EXTERNAL OR PURE
C     INTERNAL FLOW)
      IF(KW.GT.0 .OR. LW.GT.0) GO TO 1200
C     UPPER WALL PRESENT?
      IF(LKMXBC-1) 1000,1020,1000
C     NO UPPER WALL
 1000 L2=LORKMX
      L1=1
C     LOWER WALL PRESENT?
      IF(LK1BC*JLK1WU) 9000,9000,1001
C     LOWER WALL OR ITS WAKE
 1001 IF(J-JLK1WU) 1002,1002,8000
 1002 IF(J.LT.JLK1WL) GO TO 9000
C
C     WALL BOUNDARY LAYER
C
 7000 CALL MUTSPF(IW,L1,J,K,SPFAC)
      CALL MUTWWK(L1,L2,1,SPFAC)
      GO TO 1990
C
C     WAKE OF A WALL
C
 8000 CALL MUTWWK(L1,L2,0,0.0)
      GO TO 1990
C
C     NO WALLS, WAKES, OR MIXING LAYERS
C
 9000 DO 9100 L=L1,L2
 9100 TURMT(L)=0.0
      GO TO 1990
C
C
C
C     UPPER WALL IS PRESENT
 1020 L1=LORKMX
C     LOWER WALL PRESENT?
      IF(LK1BC*JLK1WU) 1025,1025,1030
C     UPPER WALL BOUNDARY LAYER SPANS ALL LORK
 1025 L2=1
      GO TO 7000
C     BOTH UPPER AND LOWER WALLS ARE PRESENT
 1030 IF(J.LT.JLK1WL) GO TO 1025
C *** THE VARIABLE LEDGE DEFINES THE COMPUTATIONAL SUBDOMAIN
C *** 1.LE.LORK.LT.LEDGE THAT IS SPANNED BY THE LOWER WALL B.L.
C *** OR WAKE AND THE SUBDOMAIN LEDGE.LE.LORK.LE.LORKMX
C *** THAT IS SPANNED BY THE UPPER WALL B.L. LEDGE IS CURRENTLY
C *** TAKEN AT THE POINT OF MAXIMUM TOTAL VELOCITY
      UMAX=0.
      DO 1040 L=1,LORKMX
      IF(UU(L).LT.UMAX) GO TO 1040
```

```
174         UMAX=UU(L)
175         LEDGE=L
176    1040 CONTINUE
177    C    UPPER WALL B.L.
178         L2=LEDGE
179         CALL MUTSPF(IW,L1,J,K,SPFAC)
180         CALL MUTWAK(L1,L2,1,SPFAC)
181    C    LOWER WALL B.L. OR WAKE
182         L1=1
183         L2=LEDGE-1
184         IF(J-JLKIWU) 7000,7000,8000
185    C *** LOGIC FOR FULL 3D NOZZLE CONFIGURATION
186    C *** THAT HAS INTERMEDIATE WALLS AND SIDE PLATES LORKW.GT.0
187    1200 CONTINUE
188    C    DEFINE THE TOLERANCE EPSWAK TO DISTINGUISH WAKES
189    C    FROM MIXING LAYERS.  IF THE MAXIMUM VELOCITY DEFECT VMIN-VMAX
190    C    IN A PROFILE SATISFIES VMIN.LT.EPSWAK*VMAX, WE HAVE
191    C    A WAKE.  OTHERWISE, WE HAVE A MIXING LAYER
192         EPSWAK=0.9
193    C     IS A SIDEWALL/SIDEPLATE PRESENT?
194         IF(KORLW) 1300,1300,1210
195    C    SIDEWALL/SIDEPLATE PRESENT
196    1210 IF(K-KORLW) 1300,1220,1225
197    1225 IF(K-(KORLW+1))1220,1220,1230
198    C    REGION OUTSIDE SIDEWALL/SIDEPLATE
199    C    MIXING LAYER
200    1230 CALL MUTMIX(1,LORKMX)
201         GO TO 1990
202    C    IN PLANE OF SIDEWALL/SIDEPLATE K=KORLW,KORLW+1
203    1220 IF(J-MAX0(JKLW,JLKW)) 1250,1250,1235
204    C    REGION DOWNSTREAM OF ALL WALLS
205    1235 UMIN=UU(1)
206         LMIN=1
207         DO 1236 L=2,LORKMX
208         IF(UU(L).GT.UMIN) GO TO 1236
209         UMIN=UU(L)
210         LMIN=L
211    1236 CONTINUE
212    C    WAKE OR MIXING LAYER? TEST UMIN AGAINST UINF
213         IF(UMIN-EPSWAK*UU(LORKMX)) 1240,1230,1230
214    C    WAKE
215    1240 CALL MUTWAK(LMIN,LORKMX,0,0.0)
216         CALL MUTWAK(LMIN,1,0,0.0)
217         GO TO 1990
218    C    REGION OF SIDEWALL/SIDEPLATE
219    C    BOUNDARY LAYER ON UPPER SURFACE OF WALL
220    1250 CALL MUTSPF(IW,LORKW+1,J,K,SPFAC)
221         CALL MUTWAK(LORKW+1,LORKMX,1,SPFAC)
222    C    BOUNDARY LAYER OR VERTICAL WALL SURFACE BELOW L=LORKW
223          IF(J-JKLW) 9000,9000,1260
224    1260 CALL MUTSPF(IW,LORKW,J,K,SPFAC)
225         CALL MUTWAK(LORKW,1,1,SPFAC)
226         GO TO 1990
227    C    IN REGION BETWEEN SYMMETRY PLANE K=1 AND SIDEWALL/SIDEPLATE K=KORLW
228    C    LOWER WALL PRESENT AT L=1 ?
229    1300 IF(JLKIWU) 1310,1310,1500
230    C    NO LOWER WALL
231    1310 IF(J.GT.JLKW) GO TO 1400
232    C    BOUNDARY LAYER ON LOWER SURFACE LORKW OF INTERMEDIATE WALL
233         CALL MUTSPF(IW,LORKW,J,K,SPFAC)
234         CALL MUTWAK(LORKW,1,1,SPFAC)
235    C    BOUNDARY LAYER ON UPPER SURFACE OF INTERMEDIATE WALL
236         CALL MUTSPF(IW,LORKW+1,J,K,SPFAC)
237         CALL MUTWAK(LORKW+1,LORKMX,1,SPFAC)
238         GO TO 1990
239    C    INTERMEDIATE WALL WAKE OR MIXING LAYER
240    1400 UMIN=UU(1)
241         LMIN=1
242         UMAX=UU(1)
243         DO 1401 L=2,LORKMX
244         IF(UU(L).GT.UMIN) GO TO 1401
245         UMIN=UU(L)
246         LMIN=L
247    1401 CONTINUE
248         UMAX=AMIN1(UU(1),UU(LORKMX))
249    C    WAKE OR MIXING LAYER?
250         IF(UMIN-EPSWAK*UMAX) 1410,1410,1230
251    C    WAKE  - IF BROAD ENOUGH
252    1410 IF((LMIN.LE.3).OR.(LMIN.GE.(LMAX-2))) GO TO 1230
253    C    INTERMEDIATE WALL WAKE CENTERED AT LMIN
254         CALL MUTWAK(LMIN,1,0,0.0)
255         CALL MUTWAK(LMIN,LORKMX,0,0.0)
256         GO TO 1990
257    1500 CONTINUE
258    C    LOWER WALL PRESENT AT L=1
259         IF(J.GT.MAX0(JLKW,JLKIWU)) GO TO 1700
260    C    REGION CONTAINING WALLS
```

```
      IF(JLKW-JLK1WU) 1520,1520,1510
 1510 WRITE(6,1515)
      PRINT 1515
 1515 FORMAT( 2X,45H*****ERROR FLAG IN SUBROUTINE MUTUR ****
     A/2X,58H*****INADMISSIBLE INPUT *****
     1/2X,58H**THIS SUBROUTINE IS NOT PRESENTLY CODED TO COMPUTE
     2/2X,58H**THE TURBULENT VISCOSITY TURMU FOR PLUGGED NOZZLES
     3/2X,58H**WHERE THE CENTRAL PLUG AT L(K)=1 IS SHORTER THAN THE
     4/2X,58H**UPPER NOZZLE WALL AT L(K)=LW(KW).  THE CURRENT
     5/2X,58H**LOGIC REQUIRES JL1WU .GE. JLW WHEN BOTH ARE POSITIVE
     6/2X,58H**AND NON-ZERO.  ADDITIONAL LOGIC WOULD BE REQUIRED
     7/2X,58H**AFTER STATEMENT 1510 TO HANDLE THE REGION
     8/2X,58H**.0.LE.JL1WU.LE.J.LE.JLW.
     9/2X,3H***     )
      STOP
 1520 IF(J.GT.JLKW) GO TO 1600
C     REGION J UPSTREAM OF INTERMEDIATE WALL TRAILING EDGE
C     BOUNDARY LAYER ON OUTER SURFACE OF INTERMEDIATE WALL
      CALL MUTSPF(IW,LORKW+1,J,K,SPFAC)
      CALL MUTWNK(LORKW+1,LORKMX,1,SPFAC)
C     BOUNDARY LAYERS INSIDE NOZZLE
      L1=LORKW
      L2=1
C     BOUNDARY LAYER ON UPPER WALL AHEAD OF PLUG
      IF(J.LT.JLK1WL) GO TO 7000
C     BOUNDARY LAYERS ON UPPER WALL AND ON LOWER WALL (PLUG)
      UMAX=UU(1)
      LEDGE=1
      DO 1530 L=2,LORKW
      IF(UU(L).LT.UMAX) GO TO 1530
      UMAX=UU(L)
      LEDGE=L
 1530 CONTINUE
C     UPPER WALL B.L.
      L2=LEDGE
 1540 CALL MUTSPF(IW,L1,J,K,SPFAC)
      CALL MUTWNK(L1,L2,1,SPFAC)
      IF(L1.EQ.1) GO TO 1990
C     B.L. ON LOWER WALL (PLUG)
      L1=1
      GO TO 1540
 1600 CONTINUE
C     SUBREGION BEHIND UPPER NOZZLE WALL AND ABOVE LOWER WALL (PLUG)
      UMAX=UU(1)
      LEDGE=1
      DO 1610 L=2,LORKMX
      IF(UU(L).LT.UMAX) GO TO 1610
      UMAX=UU(L)
      LEDGE=L
 1610 CONTINUE
C B.L. OVER LOWER WALL (PLUG)
      L1=1
      CALL MUTSPF(IW,L1,J,K,SPFAC)
      CALL MUTWNK(L1,LEDGE,1,SPFAC)
C     UPPER WALL WAKE OR MIXING LAYER OUTSIDE PLUG B.L.
      UMIN=UU(LEDGE)
      LMIN=LEDGE
      LEDGE=LEDGE+1
      DO 1620 L=LEDGE,LORKMX
      IF(UU(L).GT.UMIN) GO TO 1620
      UMIN=UU(L)
      LMIN=L
 1620 CONTINUE
C     WAKE OR MIXING LAYER?
      IF(UMIN-EPSWAK*AMIN1(UMAX,UU(LORKMX)))1630,1640,1640
C     UPPER WALL WAKE CENTERED AT LMIN
 1630 CALL MUTWNK(LMIN,LEDGE,0,0.0)
      CALL MUTWNK(LMIN,LORKMX,0,0.0)
      GO TO 1990
C     MIXING LAYER
 1640 CALL MUTMIX(LEDGE,LORKMX)
      GO TO 1990
 1700 CONTINUE
C     REGION DOWNSTREAM OF ALL WALLS
      UMAX=UU(1)
      LEDGE=1
      DO 1710 L=2,LORKMX
      IF(UU(L).LT.UMAX) GO TO 1710
      UMAX=UU(L)
      LEDGE=L
 1710 CONTINUE
      IF(LEDGE-3) 1720,1720,1730
 1720 LEDGE=1
      UMAX=UU(1)
      GO TO 1800
 1730 IF(LEDGE.GE.LORKMX-2) GO TO 1230
C     REGION 1.LE.L.LE.LEDGE.  TEST FOR LOWER WALL (PLUG) WAKE.
```

```
      IF(UU(1)-EPSWAK*UMAX) 1740,1750,1750
C     WAKE OF LOWER WALL (PLUG)
 1740 CALL MUTWWK(1,LEDGE,0,0.0)
      GO TO 1800
C     MIXING LAYER IN LOWER REGION
 1750 CALL MUTMIX(1,LEDGE)
 1800 CONTINUE
C     UPPER REGION L.GT.LEDGE. LOOK FOR WAKE OF UPPER NOZZLE WALL.
      UMIN=UU(LEDGE)
      LMIN=LEDGE
      LEDGE=LEDGE+1
      DO 1810 L=LEDGE,LORKMX
      IF(UU(L).GT.UMIN) GO TO 1810
      UMIN=UU(L)
      LMIN=L
 1810 CONTINUE
C     WAKE OR MIXING LAYER?
      IF(LMIN.GT.LEDGE+2) GO TO 1830
C     MIXING LAYER
 1820 CALL MUTMIX(LEDGE,LORKMX)
      GO TO 1990
 1830 IF(UMIN.GE.EPSWAK*AMIN1(UMAX,UU(LORKMX))) GO TO 1820
C     UPPER WALL WAKE CENTERED ABOUT LMIN
      CALL MUTWWK(LMIN,LEDGE,0,0.)
      CALL MUTWWK(LMIN,LORKMX,0,0.)
      GO TO 1990
C     LOAD KINEMATIC VISCOSITY OVER RE TEMPORARILY IN S(KL,IW,1)
 1990 DO 1999 L=LLORKL,LUORKU
      GO TO (1991,1992),IW
 1991 LORK=L
      KORL=K
      GO TO 1993
 1992 LORK=K
      KORL=L
 1993 S(LORK,IW+8,KORL)=TURMT(L)
 1999 CONTINUE
 2000 CONTINUE
 2500 CONTINUE
C     COMBINE INDIVIDUAL VISCOSITY COEFFICIENTS FOR THE K AND L DIRECTIONS
      IF(KPLANE) 2300,2300,2100
 2100 DO 2200 L=LL,LU
      DO 2200 K=KAL,KU
      TURMU(L,6,K)=RE*Q(L,1,K)*S(L,9,K)
 2200 CONTINUE
      GO TO 3000
 2300 IF(LAXIS.EQ.1) GO TO 2100
      DO 2400 L=LL,LU
      DO 2400 K=KAL,KU
      TURMU(L,6,K)=RE*Q(L,1,K)*SQRT(S(L,9,K)**2+S(L,10,K)**2)
 2400 CONTINUE
 3000 CONTINUE
C      IF(IFIRST.EQ.1) CALL TURCHK
      RETURN
      END
```

```
1  *DECK MUTWWK
2        SUBROUTINE MUTWWK(L1,L2,IWALL,SPFAC)
3  *CALL BASE
4  *CALL VARS1
5        COMMON/VISC/TAS(32),UU(32),SNOR(32),TMO(32),TM1(32),TURMT(32),
6       1   DS(32),U(32),V(32),W(32),E(32),FF(32)
7  *CALL VARS2
8        DATA FK,AP,FKK,F27,FCWK,FCKLEB,FELMIX/0.4,26.,.0168,1.6,.5,.3,.26/
9  C     TURBULENT KINEMATIC VISCOSITY FOR WALL BOUNDARY LAYER (IWALL=1)
10 C     OR WAKE (IWALL=0) WHERE WALL (OR WAKE CENTER) IS AT L=L1 AND B.L. EDGE
11 C     OR WAKE EDGE IS AT L=L2
12 C     ARC LENGTH SNOR, MAXIMUM VORTICITY, VELOCITY EXTREMA, AND
13 C     VORTICITY FUNCTION FF.
14       RA=SPFAC*SQRT(TAS(L1))/AP
15       IDL=1
16       IF(L1.GT.L2) IDL=-1
17       L=L1
18       I2=IABS(L2-L1)+1
19       IM=1
20       SNOR(1)=0.
21       TASMAX=TAS(L1)
22 C     MAX VORTICITY AND ITS LOCATION
23       ITASMX=1
24       DO 1 I=2,I2
25       L=L+IDL
26       IF(TAS(L).LE.TASMAX) GO TO 1
27       TASMAX=TAS(L)
28       ITASMX=I
29     1 CONTINUE
30 C     FIRST MINIMUM BEYOND THE ABSOLUTE VORTICITY MAX. DETERMINES
31 C     THE RANGE OF FF(I)
32 C     TO AVOID SPURIOUS PEAKS OUTSIDE THE SENSIBLE BOUNDARY LAYER
33 C     OR WAKE REGION
34       IFF = ITASMX
35       L=L1
36       DO 2 I=2,I2
37       L=L+IDL
38       IF(I.LE.ITASMX) GO TO 2
39       IF(TAS(L).LE.TAS(L-IDL)) GO TO 2
40       IFF=I
41       GO TO 3
42     2 CONTINUE
43     3 L=L1
44       UMAX=UU(L1)
45       UMIN=UU(L1)
46       FF(1)=0.
47       FFMAX=0.
48       SNMAX=.5*(DS(L1)+DS(L1+IDL))
49       DO 5 I=2,I2
50       L=L+IDL
51       SNOR(I)=SNOR(I-1)+.5*(DS(L)+DS(L-IDL))
52     5 CONTINUE
53       L=L1
54       DO 10 I=2,I2
55       L=L+IDL
56       IF(UU(L).GT.UMAX) UMAX=UU(L)
57       IF(UU(L).LT.UMIN) UMIN=UU(L)
58       E1=RA*SNOR(I)
59       IF(E1.GT.50) E1=50
60       FF(I)=SNOR(I)*TAS(L)*(1.-IWALL*EXP(-E1))
61       IF(I.GT.IFF) GO TO 10
62       IF(FF(I).LT.FFMAX) GO TO 9
63       IM=I
64       FFMAX=FF(I)
65       SNMAX=SNOR(I)
66       GO TO 10
67     9 IF(IM.EQ.1) GO TO 10
68       IF(IWALL.NE.1) GO TO 10
69 C     FOR WALL BOUNDARY LAYER STOP WITH FIRST MAXIMUM FOUND
70 C
71       IF(FF(I).LE.FFMAX) GO TO 15
72    10 CONTINUE
73    15 CONTINUE
74 C     INTERPOLATE FOR MAXIMUM POINT OF FF
75       IF(IM.EQ.1 .OR. IM.EQ.I2) GO TO 20
76       IMP=IM+1
77       IMM=IM-1
78       BM=.5*(FF(IMP)-FF(IMM))
79       AM=BM-FF(IM)
80       IF(AM.EQ.0.) GO TO 20
81       DIM=.5*BM/AM
82       IF(ABS(DIM).GE.1) GO TO 20
83       IF(AM.GE.0.) GO TO 20
84       FFMAX=FF(IM)-.5*(BM**2)/AM
85       BM=.5*(SNOR(IMP)-SNOR(IMM))
86       AM=BM-SNOR(IM)
```

```
      SNMAX=SNOR(IM)-DIM*(BM-DIM*AM)
   20 CONTINUE
C     OUTER VISCOSITY
      UDIFF=ABS(UMAX-UMIN)
      FWAK=SNMAX*FFMAX
      IF(FFMAX.GT.FCWK*UDIFF) FWAK=SNMAX*((FCWK*UDIFF)**2)/FFMAX
      DO 30 I=1,I2
      F1A=FCKLEB*SNOR(I)/SNMAX
      IF(F1A.GT.1.E5) F1A=1.E5
      TMO(I)=FKK*F27*FWAK/(1.+5.5*F1A**6)
   30 CONTINUE
C     INNER VISCOSITY
      L=L1-1DL
      IF(IWALL.EQ.0) GO TO 50
C     WALL BOUNDARY LAYER
      DO 40 I=1,I2
      L=L+1DL
      E1=RA*SNOR(I)
      IF(E1.GT.50) E1=50
      TMI(I)=TAS(L)*(FK*SNOR(I)*(1.-EXP(-E1)))**2
   40 CONTINUE
      GO TO 70
C     WAKE
   50 DO 60 I=1,I2
      L=L+1DL
      IF(TASMAX) 52,52,54
   52 TMI(I)=0.
      GO TO 60
   54 TMI(I)=TAS(L)*(FELMIX*UDIFF/TASMAX)**2
   60 CONTINUE
C     LOAD VISCOSITIES INTO ARRAY, USING INNER VALUE UNTIL MATCH POINT IS
C     REACHED
   70 I=1
      L=L1
   80 TURMT(L)=TMI(I)
      I=I+1
      L=L+1DL
      IF(I.GT.I2) GO TO 90
      IF(TMI(I).LE.TMO(I)) GO TO 80
   81 TURMT(L)=TMO(I)
      I=I+1
      L=L+1DL
      IF(I.LE.I2) GO TO 81
C      THE TURMT ARRAY CONTAINS THE KINEMATIC VISCOSITY OVER RE
   90 RETURN
      END
```

```
          NOZL3D - NEWDT
 1  *DECK NEWDT
 2        SUBROUTINE NEWDT(DQ0QMX,IDTSW)
 3  *CALL BASE
 4        DATA RESIDS/0.0/
 5        IDTSW=0
 6        IF(IGNCAL.EQ.1) IGNCAL = 2
 7        NK=NK+1
 8        IF(ABS(DQ0QMX).GT.OMEGA) GO TO 100
 9        IF(DTFAC.EQ.1) GO TO 100
10        DTF=DTMAX/DT
11        IF(DTFAC.GT.DTF) DTFAC=DTF
12        IF(ABS(DTFAC-1.0) .LT.1.E-4) DTFAC=1.0
13        IF(DTFAC.NE.1.0) IDTSW=1
14        CNBR=0.0
15        IGNCAL=IGNCAL+1
16     100 CONTINUE
17        RETURN
18        END
```

```
          NOZL3D - NOZL3D
 1  *DECK NOZL3D
 2        PROGRAM NOZL3D(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE2,TAPE4,
 3       1 TAPE3,TAPE15)
 4  *CALL BASE
 5  C
 6  C     3-D IMPLICIT NAVIER-STOKES SOLVER FOR FULL NOZZLE GEOMETRY
 7  C
 8        CALL INITIA
 9        CALL GLOINT
10        IDTSW=0
11        DO 100 NSTEP=1,NMAX
12        NC=NSTEP+NC1
13        CALL STEP(DQ0QMX,IDTSW)
14        CALL GLOINT
15        CALL NEWDT(DQ0QMX,IDTSW)
16        IF(MOD(NSTEP,NROUT).NE.0 .OR. NSTEP.EQ.NMAX) GO TO 100
17        CALL OUTALL(2)
18   100  CONTINUE
19        CALL OUTALL(-1)
20        STOP
21        END
```

```
*DECK OUTALL
      SUBROUTINE OUTALL(NCOUT)
*CALL BASE
*CALL VARS1
*CALL VARS2
      COMMON/AXISYM/LAXIS
      NPRINT=1
      IF(NCOUT.EQ.NRST .AND. IWRIT.EQ.0) NPRINT=0
      IGLOB=0
      IF(NCOUT.LT.0) IGLOB=1
C
C
C     WRITE ON UNIT 4 AND 6
C
      WRITE(4) NC,TAU,DT,NK
      IF (NPRINT.EQ.0) GO TO 15
      KK=KU
      IF(LAXIS.EQ.1) KK=1
      WRITE (6,10)NC,TAU,DT
   10 FORMAT(1H1,5X,52HNOZZLE FLOW FIELD AS WRITTEN TO RESTART FILE AT S
     1TEP,I5,9H   TIME =,F10.5,5X,5H  DT=,F10.5//)
   15 CONTINUE
      DO 45 J=1,JMAX
      CALL LKP10(J,2)
      DO 20 L=1,LMAX
      CALL DJMET(J,L,XX(J,1),XX(J,2),XX(J,3))
      DO 20 K=1,KMAX
      Q6(L,K)=Q(L,15,K)
      XXI(L,14,K)=XX(J,1)
      YXI(L,15,K)=XX(J,2)
      ZXI(L,16,K)=XX(J,3)
C     DISCARD TURMU AND PUT X IN ITS PLACE FOR OUTPUT TO RESTART UNIT
      Q(L,6,K)=X(J)
   20 CONTINUE
      IF(IGLOB.EQ.1.AND.KPLANE.EQ.1) CALL GLOBAL(J)
      IF (NPRINT.EQ.0) GO TO 40
      DO 35 K=1,KK
      WRITE (6,25)J,K
   25 FORMAT(1H0,2X,2HJ=,I3,2X,2HK=,I3,2X,1HL,6X,1HX,11X,1HY,11X,1HZ,
     1   ,6X,6HR/RREF,5X,6HU/AREF,5X,6HV/AREF,5X,6HW/AREF,5X,6HT/TREF,
     1 5X,6HP/PREF,5X,3HENT)
      DO 35 L=1,LMAX
      R = Q(L,1,K)
      RR = 1./R
      U = Q(L,2,K)*RR
      V = Q(L,3,K)*RR
      W = Q(L,4,K)*RR
      E = Q(L,5,K)
      S2=0.0
      IF(ABS(U).GT.1.0E-17) S2=S2+U**2
      IF(ABS(V).GT.1.0E-17) S2=S2+V**2
      IF(ABS(W).GT.1.0E-17) S2=S2+W**2
      PP = GD*(E-.5*R*S2)
      TT=PP*RR
      ENT = PP/(ABS(R))**GAMMA
      WRITE (6,30)L,X(J),Y(L,7,K),Z(L,8,K),R,U,V,W,TT,PP,ENT
   30 FORMAT(1H ,14X,I3,10F11.6)
   35 CONTINUE
   40 CONTINUE
      WRITE(4) (((Q(L,N,K),L=1,LMAX),N=1,8),K=1,KMAX)
   45 CONTINUE
      IF(IGLOB.EQ.1.AND.KPLANE.EQ.1) CALL GLOANT
      WRITE (6,50)
   50 FORMAT(1H1)
      RETURN
      END
```

```
      *DECK PRECAL
            SUBROUTINE PRECAL(J)
      *CALL BASE
      *CALL VARS1
      *CALL VARS2
      C     PUT RHS & SMOOTHING TERM FOR K & L INTO S FOR NEST STEP
            IF(LAMIN.EQ.0) CALL MUTUR(J)
            CALL RHS(J)
            CALL SMOOTH(J)
      C     PUT DXIDX,DXIDY,DXIDZ INTO Q ARRAY FOR NEXT STEP
            DO 100 L=1,LMAX
            CALL XXM(L,J,1,KMAX)
            DO 100 K=1,KMAX
            DXIDX(L,14,K)=XX(K,1)
            DXIDY(L,15,K)=XX(K,2)
            DXIDZ(L,16,K)=XX(K,3)
        100 CONTINUE
            IF(J.NE.2) RETURN
      C     SET UP FOR SHOCK
            XLSKM2=0.
            ZLSKM2=Z(LMAX-1,8,KM)
            XLS22=0.
            ZLS22=Z(LMAX-1,8,KL2)
            RETURN
            END
```

```
*DECK QDRTR
      SUBROUTINE QDRTR(ENTGRL,ENTGRD,DLT,IL,IU)
      DIMENSION ENTGRD(1)
C   1-D TRAPEZOIDAL QUADRATURE. COMPUTES DEFINITE INTEGRAL,ENTGRL,
C   OF INTEGRAND,ENTGRD(I),BETWEEN LIMITS IL,IU.
C
      ENTGRL=0.5*(ENTGRD(IL)+ENTGRD(IU))
      IF((IU-IL).LT.2) RETURN
      ILP=IL+1
      IUM=IU-1
      DO 1 I=ILP,IUM
    1 ENTGRL=ENTGRL+ENTGRD(I)
      ENTGRL=ENTGRL*DLT
      RETURN
      END
```

```
1  *DECK RHS
2        SUBROUTINE RHS(J)
3  *CALL BASE
4  *CALL VARS1
5  *CALL BTRID
6  *CALL VARS2
7        RO = -HDZ
8        LWR=LW+1
9        KWR=KW+1
10       IF(KW.LE.0) KWR=KMAX+1
11       INTWAL=0
12       IF(LW.GT.1.AND.J.LE.JLW) INTWAL=1
13       DO 55 K=KAL,KU
14       IF(K.GE.KWR) INTWAL=0
15       CALL ZZM(J,K,1,LMAX)
16       DO 15 L=1,LMAX
17       CALL FLUXVE(K,L,ZZ(L,1),ZZ(L,2),ZZ(L,3),ZZ(L,4))
18       DO 10 N=1,5
19    10 C(L,N,1) = FV(N)
20    15 CONTINUE
21       ISYMIN=0
22       ISYMAX=0
23 C     TEST FOR SYMMETRY AT LMAX
24       IF(LMAXBC.EQ.3.OR.LMAXBC.EQ.4) ISYMAX=LMAXBC
25 C     TEST FOR WALL AT L=1
26       IF((K.LT.KWR).AND.(JL1WL.LE.J.AND.J.LE.JL1WU)) GO TO 35
27 C     SYMMETRY
28    25 ISYMIN=4
29    35 IF (INTWAL.EQ.0) GO TO 40
30       CALL DIFFER(RO,1,LW,ISYMIN,0)
31       CALL DIFFER(RO,LWR,LMAX,0,ISYMAX)
32       GO TO 45
33    40 CALL DIFFER(RO,1,LMAX,ISYMIN,ISYMAX)
34    45 CONTINUE
35 C     ZTM =ZZ(1,4)/Q6(1,K)
36 C     ZT = ZZ(2,4)/Q6(2,K)
37       DO 55 L=LL,LU
38 C     ZTP = ZZ(L+1,4)/Q6(L+1,K)
39 C     DDV = RO*(ZTP - ZTM)
40       DDV=0.0
41       DO 50 N=1,5
42    50 S(L,N+8,K) = F(L,N) - DDV*Q(L,N,K)*Q6(L,K)
43 C     ZTM = ZT
44 C     ZT = ZTP
45    55 CONTINUE
46       IF (KPLANE.EQ.1) GO TO 110
47       RO = -HDY
48       LWR=LW+1
49       KWR=KW+1
50       IF(LW.LE.0) LWR=LMAX+1
51       INTWAL=0
52       IF(KW.GT.1.AND.J.LE.JKW) INTWAL=1
53       DO 105 L=LL,LU
54       IF(L.GE.LWR) INTWAL=0
55       CALL YYM(J,L,1,KMAX)
56       DO 65 K=1,KMAX
57          CALL FLUXVE(K,L,YY(K,1),YY(K,2),YY(K,3),YY(K,4))
58       DO 60 N=1,5
59    60    C(K,N,1) = FV(N)
60    65    CONTINUE
61       ISYMIN=0
62       ISYMAX=0
63 C     TEST FOR SYMMETRY AT KMAX
64       IF(KMAXBC.EQ.3.OR.KMAXBC.EQ.4) ISYMAX=KMAXBC
65 C     TEST FOR WALL AT K=1
66       IF((L.LT.LWR).AND.(JK1WL.LE.J.AND.J.LE.JK1WU)) GO TO 85
67 C     SYMMETRY
68    75 ISYMIN=3
69    85 IF (INTWAL.EQ.0) GO TO 90
70       CALL DIFFER(RO,1,KW,ISYMIN,0)
71       CALL DIFFER(RO,KWR,KMAX,0,ISYMAX)
72       GO TO 95
73    90 CALL DIFFER(RO,1,KMAX,ISYMIN,ISYMAX)
74    95 DO 100 N=1,5
75       DO 100 K=KAL,KU
76   100    S(L,N+8,K) = F(K,N)+S(L,N+8,K)
77   105    CONTINUE
78   110 CONTINUE
79       IF(INVISC.NE.0) RETURN
80 C     VISCOUS RIGHT HAND SIDE
81 C     VISCOUS TERMS FOR L DIRECTION
82       IF(LVIS.EQ.1) CALL DZZDYY(1,J)
83       IF(KPLANE.EQ.1) RETURN
84 C     VISCOUS TERMS FOR K DIRECTION
85       IF(KVIS.EQ.1) CALL DZZDYY(2,J)
86 C     VISCOUS CROSS DERIVATIVES
```

```
                NOZL3D - RHS
87          IF(KLVIS.EQ.0) RETURN
88          CALL DZYDYZ(1,J)
89          CALL DZYDYZ(2,J)
90.         RETURN
91          END
```

```
                NOZL3D - RHSJ
 1  *DECK RHSJ
 2        SUBROUTINE RHSJ(L)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL BTRID
 6  *CALL VARS2
 7        R0 = -HDX
 8        XXJ4=0.0
 9        DO 15 J=1,JMAX
10        XXJ1=DXIDX(L,14,J)
11        XXJ2=DXIDY(L,15,J)
12        XXJ3=DXIDZ(L,16,J)
13        CALL FLUXVE(J,L,XXJ1,XXJ2,XXJ3,XXJ4)
14        DO 10 N=1,5
15     10       C(J,N,1) = FV(N)
16     15       CONTINUE
17        CALL DIFFER(R0,1,JMAX,0,0)
18        DO 20 J=JB,JMAX
19        DO 20 N=1,5
20     20       S(L,N+8,J) = F(J,N)+S(L,N+8,J)
21        RETURN
22        END
```

```
      *DECK SHOCK
            SUBROUTINE SHOCK
      *CALL BASE
      *CALL VARS1
      *CALL SHOCKC
      *CALL VARS2
      C     COMPUTE CARTESIAN VELOCITY COMPONTS OF SHOCK SURFACE GRID PTS L=LS
            SHKWT = 0.
            SHKWT = 0.1
            LS=LMAX-1
            LSP = LMAX-4
            OJM2 = 1./(JMAX-2)
            DX2=.5/DX1
            DY2=.5/DY1
            DZ2=.5/DZ1
            PI=4.0*ATAN(1.0)
            CS=COS(PI*ALP/180.0)
            SS=SIN(PI*ALP/180.0)
            GAMP=GAMMA+1.0
      C   SHOCK SPEEDS ON REGULAR ZETA LINES OF MESH
            L=LS
            DO 15  J = 2,JMAX
            JP=J+1
            JR=J-1
            PWT = (J-2)*OJM2
            DO 10 K=KAL,KU
      C     SHOCK GRID POINT VELOCITY COMPONENTS
            QSZETA=0.0
            XL=0.0
            YL=0.0
            ZL=0.0
            AL = SQRT(XL**2 + YL**2 + ZL**2)
            QS(J,K) = QSZETA*AL
            QSZETA = QSZETA*SHKWT
            XST(J,K)=QSZETA*XL
            YST(J,K)=QSZETA*YL
            ZST(J,K)=QSZETA*ZL
         10 CONTINUE
            IF(KPLANE.EQ.1) GO TO 15
      C     QS(J,1) = QS(J,3)
      C     QS(J,KMAX) = QS(J,KMAX-2)
      C     XST(J,1)=XST(J,3)
      C     XST(J,KMAX)=XST(J,KMAX-2)
      C     YST(J,1)=-YST(J,3)
      C     YST(J,KMAX)=-YST(J,KMAX-2)
      C     ZST(J,1)=ZST(J,3)
      C     ZST(J,KMAX)=ZST(J,KMAX-2)
         15 CONTINUE
      C   SHOCK SPEED ON SINGULAR ZETA LINE J = 1
            XJ = (XLSKM2-XLS22)*DX2
            ZJ = (ZLSKM2-XLS22)*DX2
            AN = SQRT(XJ**2 + ZJ**2)
            XN = -ZJ
            ZN = XJ
            QSN = 0.
            XST0 = QSN*SHKWT
            DO 1  K = 1,KMAX
            QS(1,K) = QSN
            XST(1,K) = XST0
            XST(1,K) = 0.
            YST(1,K) = 0.
          1 ZST(1,K) = 0.
            WRITE(3) NC,TAU,DT,
           1         ((QS(J,K),J = 1,JMAX),K = 1,KMAX)
         11 RETURN
            END
```

```
*DECK SMOOTH
      SUBROUTINE SMOOTH(JJ)
*CALL BASE
*CALL VARS1
*CALL VARS2
      COMMON/AXISYM/LAXIS
      DIMENSION CDM(5)
C     GLOBALLY FULLY CONSERVATIVE SMOOTHING

C     ZETA(L) DIRECTION OR ETA(K) DIRECTION
      SM0=0.5*SMU/(8.*(3.0-FLOAT(KPLANE)))
      DO 100 IW=1,2
      LORKW=LW
      KORLW=KW
      JLKW=JLW
      KLORLL=KAL
      KUORLU=KU
      LMORKM=LM
      KORLMX=KMAX
      LKMXBC=LMAXBC
      LK1BC=L1BC
      JLK1WL=JL1WL
      JLK1WU=JL1WU
      L1=1
      K1=0
      IF (IW.EQ.1) GO TO 10
      IF (KPLANE.EQ.1) GO TO 100
      JLKW=JKW
      LORKW=KW
      KORLW=LW
      KLORLL=LL
      KUORLU=LU
      LMORKM=KM
      KORLMX=LMAX
      LKMXBC=KMAXBC
      LK1BC=K1BC
      JLK1WL=JK1WL
      JLK1WU=JK1WU
      L1=0
      K1=1
   10 CONTINUE
      J=JJ
      KLXP=KORLMX
      IF(KORLW.GT.0) KLXP=KORLW
      DO 95 KORL=KLORLL,KUORLU
      IF(LORKW) 11,11,12
   11 M2=1
      LK1=2
      LK2=LMORKM
      GO TO 15
   12 IF(KORL.GT.KLXP.OR.J.GE.JLKW) GO TO 11
      M2=2
      LK1=2
      LK2=LORKW-1
   15 DO 95 M=1,M2
      IF (M-2) 25,20,25
   20 LK1=LORKW+2
      LK2=LMORKM
      NSYML=0
      GO TO 30
   25 NSYML=0
C  TEST FOR LOWER SYMMETRY PLANE
      IF(LK1BC.EQ.1.AND.(J.LT.JLK1WL.OR.J.GT.JLK1WU.OR.KORL.GT.KLXP))
     1   NSYML=5-IW
C  TEST FOR UPPER SYMMETRY PLANE
   30 NSYMU=0
      IF(LK2.EQ.LMORKM.AND.(LKMXBC.EQ.3.OR.LKMXBC.EQ.4)) NSYMU = LKMXBC
      DO 35 N=1,5
   35 CDM(N)=0.0
      SM1=0.0
      DO 40 LORK=LK1,LK2
      L=LORK
      K=KORL
      IF(IW.EQ.2) L=KORL
      IF(IW.EQ.2) K=LORK
   40 SM1=AMAX1(SM1,ABS((Q6(L+L1,K+K1)-Q6(L-L1,K-K1))/Q6(L,K)))
      SM1=SM0/(1.0+0.25*SM1)
      LK2M=LK2-1
      IF(LAXIS.NE.1) GO TO 41
      IF(LK1.EQ.2.AND.IW.EQ.1) GO TO 42
   41 IF (LK1.GT.2.OR.NSYML.EQ.0) GO TO 60
C  SMOOTHING AT LOWER SYMMETRY PLANE OR SYMMETRY AXIS
   42 L=1
      K=KORL
      IF(IW.EQ.2) L=KORL
      IF(IW.EQ.2) K=1
```

```
      CJ=Q6(L+L1,K+K1) + Q6(L,K)
      DO 55 N=1,5
      IF(LAXIS) 658,658,656
  656 IF(IW.NE.1) GO TO 658
      IF(LK1-2)658,657,658
C     SMOOTHING AT SYMMETRY AXIS
  657 IF(N.EQ.3 .OR. N.EQ.4) GO TO 45
      GO TO 50
  658 IF (N-NSYML) 50,45,50
   45 S(L,N+8,K)=S(L,N+8,K)-6.0*SM1*CJ*Q(L,N,K)
      CDM(N)=CJ*(Q(L+2*L1,N,K+2*K1)+Q(L,N,K)+
     1  2.*(Q(L,N,K)-Q(L+L1,N,K+K1)))
      GO TO 55
   50 CDM(N)=CJ*(Q(L+2*L1,N,K+2*K1)-Q(L+L1,N,K+K1)
     1+3.*(Q(L,N,K)-Q(L+L1,N,K+K1)))
      S(L,N+8,K)=S(L,N+8,K)-2.0*SM1*CDM(N)
   55 CONTINUE
   60 CONTINUE
      DO 65 LORK=LK1,LK2M
      L=LORK
      K=KORL
      IF(IW.EQ.2) L=KORL
      IF(IW.EQ.2) K=LORK
      CJ=Q6(L+L1,K+K1)+Q6(L,K)
      DO 65 N=1,5
      CDKLN=CJ*(Q(L+2*L1,N,K+2*K1)-3.0*(Q(L+L1,N,K+K1)
     1 -Q(L,N,K))-Q(L-L1,N,K-K1))
      S(L,N+8,K)=S(L,N+8,K)-SM1*(CDKLN-CDM(N))
      CDM(N)=CDKLN
   65 CONTINUE
      L=LK2
      K=KORL
      IF(IW.EQ.2) L=KORL
      IF(IW.EQ.2) K=LK2
      CJ=Q6(L+L1,K+K1)+Q6(L,K)
      DO 90 N=1,5
      IF (NSYMU) 75,70,75
   70 S(L,N+8,K)=S(L,N+8,K)+SM1*CDM(N)
      GO TO 90
C  SMOOTHING AT UPPER SYMMETRY PLANE
   75 IF (N-NSYMU) 85,80,85
   80 S(L+L1,N+8,K+K1)=S(L+L1,N+8,K+K1)-6.0*SM1*CJ*Q(L+L1,N,K+K1)
      CDKLN=CJ*(-(Q(L+L1,N,K+K1)+Q(L-L1,N,K-K1))
     1+2.*(Q(L,N,K)-Q(L+L1,N,K+K1)))
      S(L,N+8,K)=S(L,N+8,K)-SM1*(CDKLN-CDM(N))
      GO TO 90
   85 CDKLN=CJ*(Q(L,N,K)-Q(L-L1,N,K-K1)+3.*
     1(Q(L,N,K)-Q(L+L1,N,K+K1)))
      S(L,N+8,K)=S(L,N+8,K)-SM1*(CDKLN-CDM(N))
      S(L+L1,N+8,K+K1)=S(L+L1,N+8,K+K1)+2.0*SM1*CDKLN
   90 CONTINUE
   95 CONTINUE
  100 CONTINUE
      RETURN
      END
```

```
      *DECK SMOTHJ
            SUBROUTINE SMOTHJ(L)
      *CALL BASE
      *CALL VARS1
      *CALL VARS2
            DIMENSION CDM(5)
      C     GLOBALLY FULLY CONSERVATIVE SMOOTHING
            JMM=JM-1

      C     XI DIRECTION
            DO 100 N=1,5
        100 CDM(N)=0.0
            SM1=0.0
            DO 150 J=2,JM
        150 SM1=AMAX1(SM1,ABS((Q6(L,J+1)-Q6(L,J-1))/Q6(L,J)))
            SM1=SM0/(1.0+0.25*SM1)
            DO 200 J=2,JMM
            CJ=Q6(L,J+1)+Q6(L,J)
            DO 200 N=1,5
            CDJN=CJ*(Q(L,N,J+2)-3.0*(Q(L,N,J+1)
           1                        -Q(L,N,J))-Q(L,N,J-1))
            S(L,N+8,J)=S(L,N+8,J)-SM1*(CDJN-CDM(N))
            CDM(N)=CDJN
        200 CONTINUE
            DO 300 N=1,5
        300 S(L,N+8,JM)=S(L,N+8,JM)+SM1*CDM(N)
            RETURN
            END
```

```
      *DECK STEP
            SUBROUTINE STEP(DQ0QMX,IDTSW)
      *CALL BASE
      *CALL VARS1
      *CALL SHOCKC
      *CALL BTRID
      *CALL GLOB
            COMMON/FILTR/INFLT
      *CALL VARS2
            DIMENSION DINTGL(5)
      C
            JT=1
            KT=1
            LT=1
            SIGMAX=0.0
            JTJ=1
            KTJ=1
            LTJ=1
            SIGJMX=0.0
      C     CALL SHOCK
      C
      C     J SWEEP ALONG (K,L) LINES
            VOL=0.
            RESM=0.
            RESID=0.0
            K1=2
            K2=KM
            JMH= JM-1
            KMH= KM-1
            LMH= LM-1
            IF (KPLANE.EQ.0) GO TO 10
            K1=KAL
            K2=KU
            KMH=1
         10 CONTINUE
            DO 65 K=1,KMAX
            CALL LJPIO(K,2)
            DO 15 L=1,LMAX
            DO 15 J=1,JMAX
            Q6(L,J)=Q(L,15,J)
            DXIDY(L,15,J)=0.
            DXIDZ(L,16,J)=0.
         15 CONTINUE
            DO 60 L=LL,LU
            DO 20 J=1,JMAX
            CALL DJMET(J,L,XX(J,1),XX(J,2),XX(J,3))
         20 CONTINUE
            IF (K.LT.KAL.OR.K.GT.KU) GO TO 50
            IF(IGNCAL.GE.2) CALL EIGENJ(K,L)
            CALL RHSJ(L)
            CALL SMOTHJ(L)
            IF (K.LT.K1.OR.K.GT.K2) GO TO 35
            IF (L.LT.2.OR.L.GT.LM) GO TO 35
            DO 30 J=2,JM
            DO 30 N=1,5
            DVOL=1.0/Q6(L,J)
            VOL= VOL+DVOL
            RES=ABS(S(L,N+8,J))
            IF (RES-RESM) 30,30,25
         25 RESM=RES
            JRESM=J
            KRESM=K
            LRESM=L
            NRESM=N
         30 RESID=RESID+RES**2
         35 CALL FILTRX(K,L,1,JMAX)
            IF(J1BC.NE.0) CALL BCXIN(L)
            CALL BCXOUT(L)
            IF(J1BC.NE.0) CALL BCJMAT(1,K,L,1)
            IF(JMAXBC.EQ.2) CALL BCJMAT(JMAX,K,L,1)
            CALL BCALJ(K,L)
      C  S MUST BE ZERO ON B.C.
            CALL BTRI(JB,JMAX)
            DO 45 J=JB,JMAX
            DO 45 N=1,5
         45 S(L,N+8,J) = F(J,N)*Q6(L,J)
      C     PUT XX1,YX1,ZX1 ONTO DISC FOR K & L SWEEPS BELOW
         50 DO 55 J=1,JMAX
            Q(L,14,J)=Q6(L,J)
            YX1(L,15,J)=XX(J,2)
         55 ZX1(L,16,J)=XX(J,3)
         60 CONTINUE
            CALL LJPIO(K,1)
         65 CONTINUE
            RESID = SQRT(RESID)/(DT+.00005)/(JMH*KMH*LMH*5.0)
            NCM=NC-1
```

```
            NOZL3D - STEP
      WRITE (6,70)NCM,RESID,RESM,JRESM,KRESM,LRESM,NRESM
      PRINT 70,NCM,RESID,RESM,JRESM,KRESM,LRESM,NRESM
   70 FORMAT(1H0,2HN=,I4,1X,9HL2 RESID=,1PE10.3,11H MAX RESID=,
     1  1PE10.3,9H J,K,L,N=,I2,3(1H,,I2))
      IF (RESID.LT.1.) GO TO 80
      WRITE (6,75)
   75 FORMAT(41H ****STOPPING**RESIDUAL IS GREATER THAN 1  )
      CALL OUTALL(NC)
      GO TO 190
   80 CONTINUE
C
C
C
C     K SWEEP ALONG (J,L) LINES
      DQ0QMX=0.
      RUMAX=0.
      DO 180 J=1,JMAX
      CALL LKP10(J,2)
C     SET UP TO AVOID DQ0Q FOR N=2 IN SEPARATED REGIONS
C
      IF(KPLANE.EQ.1) GO TO 84
      DO 83 L=LL,LU
      DO 83 K=KAL,KU
      IF(Q(L,2,K).LE.RUMAX) GO TO 83
      RUMAX=Q(L,2,K)
   83 CONTINUE
   84 CONTINUE
      CALL DJMET2(J,L,XJ)
      DO 85 L=1,LMAX
      DO 85 K=1,KMAX
      Q6(L,K)=Q(L,14,K)
      XXI(L,14,K)=XJ
   85 CONTINUE
      IF (J.LT.JB) GO TO 165
      IF(IGNCAL.GE.2) CALL EIGEN(J)
      IF (KPLANE.EQ.1) GO TO 120
      DO 115 L=LL,LU
         CALL FILTRY(J,L,1,KMAX)
      CALL BCLK1(2,J,L)
      CALL BCLKMX(2,J,L)
      IF(INVISC.EQ.0) CALL VISMAT(2,J,L)
      IF (J.EQ.1.AND.J1BC.NE.0) GO TO 90
      IF (J.EQ.JMAX.AND.JMAXBC.EQ.2) GO TO 90
      GO TO 100
   90 DO 95 K=KAL,KU
   95 CALL BCJMAT(J,K,L,2)
  100 CONTINUE
      CALL BCALKL(J,L,1)
         CALL BTRI(KAL,KU)
      IF(J*J1BC.EQ.1.AND.INFLT.EQ.1) CALL INFLTR(2,L)
      DO 110 N=1,5
      DO 110 K=KAL,KU
  110    S(L,N+8,K) = F(K,N)*Q6(L,K)
  115    CONTINUE
C
C
C     L SWEEP ALONG J,K LINES
  120 R0 = -HDZ
      DO 160 K=KAL,KU
            CALL FILTRZ(J,K,1,LMAX)
      CALL BCLK1(1,J,K)
      CALL BCLKMX(1,J,K)
      IF(INVISC.EQ.0) CALL VISMAT(1,J,K)
      IF (J.EQ.1.AND.J1BC.NE.0) GO TO 125
      IF (J.EQ.JMAX.AND.JMAXBC.EQ.2) GO TO 125
      GO TO 135
  125 DO 130 L=LL,LU
  130 CALL BCJMAT(J,K,L,3)
  135 CONTINUE
      CALL BCALKL(J,K,2)
            CALL BTRI(LL,LU)
      IF(J*J1BC.EQ.1.AND.INFLT.EQ.1) CALL INFLTR(3,K)
      DO 155 L=LL,LU
      DO 150 N=1,5
      IF (N.EQ.3.OR.N.EQ.4) GO TO 145
      IF(N.EQ.2.AND.(ABS(Q(L,2,K)).LT.0.01*RUMAX))GO TO 145
      IF (Q(L,N,K).EQ.0.) GO TO 145
      DQ0Q=F(L,N)/Q(L,N,K)
      IF (ABS(DQ0Q).LE.ABS(DQ0QMX)) GO TO 145
      DQ0QMX=DQ0Q
      JDQ=J
      KDQ=K
      LDQ=L
      NDQ=N
  145 CONTINUE
  150 Q(L,N,K) = F(L,N) + Q(L,N,K)
  155 CONTINUE
```

```
174     160       CONTINUE
175   C
176     165 CALL BC(J)
177         CALL GLOBL(J)
178         IF (J.NE.JTT) GO TO 170
179   C     NOZZLE DISCHARGE COEFFICIENT CW
180   C     INTEGRATE MASS FLOW AT THROAT J=JT
181         NMX=1
182         L1=1
183         L2=LMAX
184         IF(LW.GT.0) L2=LW
185         K1=1
186         K2=KMAX
187         IF(KW.GT.0) K2=KW
188         CALL GDINTF(J,K1,K2,L1,L2,NMX,DINTGL)
189         CW=DINTGL(1)/(CWFAC*AT)
190     170 CONTINUE
191         IF(IDTSW.EQ.0) GO TO 172
192         CALL DTSW(1)
193     172 CALL PRECAL(J)
194         DO 175 L=1,LMAX
195         DO 175 K=1,KMAX
196         Q(L,15,K)=Q6(L,K)
197     175 CONTINUE
198         CALL LKP10(J,1)
199   C     SWITCH DT BACK , IF NECESSARY
200         IF(IDTSW.EQ.0) GO TO 180
201         CALL DTSW(2)
202     180 CONTINUE
203   C
204         TAU = TAU + DT
205         WRITE (6,185)NC,TAU,DT,DQ0QMX,JDQ,KDQ,LDQ,NDQ
206     185 FORMAT(1H0,5X,4H NC=,I3,6H TIME=,F10.4,4H DT=,E11.4,
207        1  1X,17HMAXIMUM DELTAQ/Q=,1PE10.3,11HAT J,K,L,N=I2,3(1H,,I2))
208         IF(NK.EQ.0.AND.RESIDS.LT.RESID) NRES=2*NRES
209         IF(NSTEP.EQ.2) RESIDS=RESID
210   C     SWITCH DT FOR NEXT STEP IF IDTSW.NE.0
211         IF(IDTSW.NE.0) CALL DTSW(1)
212         RETURN
213   C
214   C     ERROR STOP WHEN RESIDUAL  > 1
215     190 STOP
216         END
```

```
 1  *DECK SW
 2        SUBROUTINE SW
 3  *CALL RHSBCC
 4  *CALL BASE
 5        IF(IW.EQ.2) GO TO 100
 6        LORKMX=LMAX
 7        KORLMX=KMAX
 8        LMORKM=LM
 9        LLORKL=LL
10        LUORKU=LU
11        KLORLL=KAL
12        KUORLU=KU
13        LKMXBC=LMAXBC
14        KLMXBC=KMAXBC
15        LK1BC=L1BC
16        KL1BC=K1BC
17        LORKW=LW
18        KORLW=KW
19        JLKW=JLW
20        JKLW=JKW
21        JLK1WL=JL1WL
22        JLK1WU=JL1WU
23        JKL1WL=JK1WL
24        JKL1WU=JK1WU
25        DZORDY=DZ1
26        RETURN
27      100 LORKMX=KMAX
28        KORLMX=LMAX
29        LMORKM=KM
30        LLORKL=KAL
31        LUORKU=KU
32        KLORLL=LL
33        KUORLU=LU
34        LKMXBC=KMAXBC
35        KLMXBC=LMAXBC
36        LK1BC=K1BC
37        KL1BC=L1BC
38        KORLW=LW
39        LORKW=KW
40        JLKW=JKW
41        JKLW=JLW
42        JKL1WL=JL1WL
43        JKL1WU=JL1WU
44        JLK1WL=JK1WL
45        JLK1WU=JK1WU
46        DZORDY=DY1
47        RETURN
48        END
```

```
                NOZL3D - VISCOF
 1  *DECK VISCOF
 2        SUBROUTINE VISCOF(TEMP,RMUE)
 3  *CALL VISCO
 4  C
 5  C     DIMENSIONLESS LAMINAR VISCOSITY COEFFICIENT RMUE IS EVALUATED
 6  C     FROM SUTHERLAND LAW WHEN ISUTH=1, AND FROM POWER LAW WHEN ISUTH=0
 7  C
 8        IF(ISUTH-1) 20,10,30
 9  C     SUTHERLAND LAW
10     10 RMUE= (TEMP**1.5)/(TEMP+TSUTH)
11        RETURN
12  C     POWER LAW
13     20 RMUE=TEMP**RMUEXP
14        RETURN
15     30 CONTINUE
16        RETURN
17        END
```

```
1  *DECK VISMAT
2        SUBROUTINE VISMAT(IWW,JJ,K)
3  *CALL BASE
4  *CALL VARS1
5  *CALL BTRID
6  *CALL RHSBCC
7  *CALL VISC
8  *CALL VARS2
9  C     JACOBIAN MATRICES FOR VISCOUS TERMS THAT ARE TREATED IMPLICITLY
10       IW=IWW
11       J=JJ
12       CALL SW
13       GKPR = GAMMA/PR
14       PRTR = PR/0.9
15       DRE = -HD/(RE*DZORDY**2)
16       IF (IW.EQ.2) GO TO 10
17       CALL ZZM(J,K,1,LMAX)
18       GO TO 20
19    10 CALL YYM(J,K,1,KMAX)
20       DO 15 N=1,4
21       DO 15 L=1,KMAX
22    15 ZZ(L,N)=YY(L,N)
23    20 R3 = 1./3.
24       DO 25 L=1,LORKMX
25       LLL=L
26       KKK=K
27       IF(IW.EQ.2) LLL=K
28       IF(IW.EQ.2) KKK=L
29       RR(L) = 1./Q(LLL,1,KKK)
30       Q2=(Q(LLL,2,KKK)**2+Q(LLL,3,KKK)**2+Q(LLL,4,KKK)**2)*RR(L)
31       T = GD*(Q(LLL,5,KKK) - 0.5*Q2)*RR(L)
32       CALL VISCOF(T,RMUE)
33       VNU = RMUE+TURMU(LLL,6,KKK)
34       GKAP = RMUE+PRTR*TURMU(LLL,6,KKK)
35       RJ = 1./Q6(LLL,KKK)
36       S0(L) = (ZZ(L,1)**2+ZZ(L,2)**2+ZZ(L,3)**2)*RJ
37       S1(L) = (S0(L)+R3*ZZ(L,1)**2*RJ)*VNU
38       S2(L) = (S0(L)+R3*ZZ(L,2)**2*RJ)*VNU
39       S3(L) = (S0(L)+R3*ZZ(L,3)**2*RJ)*VNU
40       S4(L) = R3*ZZ(L,1)*ZZ(L,2)*RJ*VNU
41       S5(L) = R3*ZZ(L,1)*ZZ(L,3)*RJ*VNU
42       S6(L) = R3*ZZ(L,2)*ZZ(L,3)*RJ*VNU
43       S0(L) = S0(L)*GKPR*GKAP
44       RR(L) = 1./Q(LLL,1,KKK)
45       U(L) = Q(LLL,2,KKK)*RR(L)
46       V(L) = Q(LLL,3,KKK)*RR(L)
47       W(L) = Q(LLL,4,KKK)*RR(L)
48       E(L) = Q(LLL,5,KKK)*RR(L)
49    25 CONTINUE
50       DO 30 L=2,LORKMX
51       LR = L-1
52       C0 = S0(L)+S0(LR)
53       C1 = S1(L)+S1(LR)
54       C2 = S2(L)+S2(LR)
55       C3 = S3(L)+S3(LR)
56       C4 = S4(L)+S4(LR)
57       C5 = S5(L)+S5(LR)
58       C6 = S6(L)+S6(LR)
59       D(L,2,1) =  -(C1*U(LR)+C4*V(LR)+C5*W(LR))*RR(LR)
60       DEU(L,2,1)=  -(C1*U(L )+C4*V(L )+C5*W(L ))*RR(L )
61       D(L,2,2) =  C1*RR(LR)
62       DEU(L,2,2) = C1*RR(L)
63       D(L,2,3) = C4*RR(LR)
64       DEU(L,2,3) = C4*RR(L)
65       D(L,2,4) = C5*RR(LR)
66       DEU(L,2,4) = C5*RR(L)
67       D(L,2,5) = 0.0
68       DEU(L,2,5) = 0.0
69       D(L,3,1) = -(C2*V(LR)+C4*U(LR)+C6*W(LR))*RR(LR)
70       DEU(L,3,1)= -(C2*V(L )+C4*U(L )+C6*W(L ))*RR(L )
71       D(L,3,2) = C4*RR(LR)
72       DEU(L,3,2) = C4*RR(L)
73       D(L,3,3) = C2*RR(LR)
74       DEU(L,3,3) = C2*RR(L)
75       D(L,3,4) = C6*RR(LR)
76       DEU(L,3,4) = C6*RR(L)
77       D(L,3,5) = 0.0
78       DEU(L,3,5) = 0.0
79       D(L,4,1)  -(C3*W(LR)+C5*U(LR)+C6*V(LR))*RR(LR)
80       DEU(L,4,1) =-(C3*W(L )+C5*U(L )+C6*V(L ))*RR(L )
81       D(L,4,2) = C5*RR(LR)
82       DEU(L,4,2) = C5*RR(L)
83       D(L,4,3) = C6*RR(LR)
84       DEU(L,4,3) = C6*RR(L)
85       D(L,4,4) = C3*RR(LR)
86       DEU(L,4,4) = C3*RR(L)
```

```
      D(L,4,5) = 0.0
      DEU(L,4,5) = 0.0
      D(L,5,1) = -((C1-C0)*U(LR)**2+(C2-C0)*V(LR)**2+(C3-C0)*W(LR)**2
     1  +2.*C4*U(LR)*V(LR)+2.*C5*U(LR)*W(LR)+2.*C6*V(LR)*W(LR)+C0*E(LR))
     2  *RR(LR)
      DEU(L,5,1) = -((C1-C0)*U(L)**2+(C2-C0)*V(L)**2+(C3-C0)*W(L)**2+
     1  2.*C4*U(L)*V(L)+2.*C5*U(L)*W(L)+2.*C6*V(L)*W(L)+C0*E(L))*RR(L)
      D(L,5,2) = ((C1-C0)*U(LR)+C4*V(LR)+C5*W(LR))*RR(LR)
      DEU(L,5,2)= ((C1-C0)*U(L )+C4*V(L )+C5*W(L ))*RR(L )
      D(L,5,3) = ((C2-C0)*V(LR)+C4*U(LR)+C6*W(LR))*RR(LR)
      DEU(L,5,3)= ((C2-C0)*V(L )+C4*U(L )+C6*W(L ))*RR(L )
      D(L,5,4) = ((C3-C0)*W(LR)+C5*U(LR)+C6*V(LR))*RR(LR)
      DEU(L,5,4) = ((C3-C0)*W(L)+C5*U(L)+C6*V(L))*RR(L)
      D(L,5,5) = C0*RR(LR)
      DEU(L,5,5) = C0*RR(L)
   30 CONTINUE
C     TEST FOR INTERMEDIATE WALL
      INTWAL=0
      IF(LORKW.GT.0.AND.J.LE.JLKW) INTWAL=1
      IF(KORLW.GT.0.AND.K.GE.KORLW+1) INTWAL=0
      DO 40 L=2,LMORKM
      LR = L+1
      DO 35 N=2,5
      DO 35 M=1,5
      IF (INTWAL.EQ.1.AND.(L.EQ.LORKW.OR.L.EQ.LORKW+1)) GO TO 35
      A(L,N,M) = A(L,N,M)+DRE*D(L,N,M)
      B(L,N,M) = B(L,N,M)-DRE*(D(LR,N,M)+DEU(L,N,M))
      C(L,N,M) = C(L,N,M)+DRE*DEU(LR,N,M)
   35 CONTINUE
   40 CONTINUE
C     IMPLICIT VISCOUS BLOCKS FOR INTERMEDIATE WALL
      IF (INTWAL.EQ.0) GO TO 50
      L=LORKW
      LR=LORKW+1
      DO 45 N=2,5
      DO 45 M=1,5
      A(L,N,M)=A(L,N,M)+2.0*DRE*D(L,N,M)
      B(L,N,M)=B(L,N,M)-2.0*DRE*DEU(L,N,M)
      C(L,N,M)=0.0
      A(LR,N,M)=0.0
      B(LR,N,M)=B(LR,N,M)-2.0*DRE*D(LR+1,N,M)
   45 C(LR,N,M)=C(LR,N,M)+2.0*DRE*DEU(LR+1,N,M)
   50 CONTINUE
C
C     FILL IN VISCOUS PORTION OF IMPLICIT COEFF. MATRIX FOR
C    IMPLICIT OUTFLOW B.C. AT L=LORKMX (LKMXBC=2 OR 5), OR FOR IMPLICIT
C    ADIABATIC WALL B.C. (LKMXBC=1), OR FOR SYMMETRY BC(LKMXBC=3,4).
C
      IF (LKMXBC.EQ.0) GO TO 65
      L=LORKMX
      DO 60 N=2,5
      IF (LKMXBC.LT.3.OR.LKMXBC.GT.4) GO TO 55
      IF (N.EQ.LKMXBC) GO TO 65
   55 DO 60 M=1,5
      A(L,N,M)=A(L,N,M) + (2.0*DRE)*D(L,N,M)
      B(L,N,M)=B(L,N,M) - (2.0*DRE)*DEU(L,N,M)
   60 CONTINUE
   65 CONTINUE
C
C     FILL IN VISCOUS PORTION OF IMPLICIT COEFF MATRIX FOR IMPLICIT
C     ADIABATIC WALL BC FOR JLK1WL.LE.J.LE.JLK1WU AND SYMMETRY BC
C     FOR J OUTSIDE THAT INTERVAL
      L=1
      IF (LK1BC.NE.1) GO TO 100
      NSYM=10
C     TEST FOR INTERMEDIATE WALL NORMAL TO L=1
      IF (KORLW) 70,70,80
C     TEST FOR WALL AT L=1
   70 IF (JLK1WL.LE.J.AND.J.LE.JLK1WU) GO TO 85
C     SYMMETRY
   75 IF(IW.EQ.1) NSYM=4
      IF(IW.EQ.2) NSYM=3
      GO TO 85
C     TEST FOR WALL AT L=1
   80 IF (K-KORLW) 70,70,75
   85 DO 95 N=2,5
      IF (N.EQ.NSYM) GO TO 95
      DO 90 M=1,5
      B(L,N,M)=B(L,N,M)-(2.0*DRE)*D(L+1,N,M)
      C(L,N,M)=C(L,N,M)+(2.0*DRE)*DEU(L+1,N,M)
   90 CONTINUE
   95 CONTINUE
  100 RETURN
      END
```

```
1  *DECK XXM
2        SUBROUTINE XXM(L,J,K1,K2)
3  *CALL BASE
4  *CALL VARS1
5  *CALL VARS2
6  C
7  C  XI METRICS FORMED FOR A K,L LINE IN J
8  C
9  C
10 C  SYMMETRY
11 C
12       DO 10 K=K1,K2
13       CALL DKMET(J,K,L,XK,YK,ZK)
14       CALL DLMET(J,K,L,XL,YL,ZL)
15       XX(K,1) = YK*ZL-ZK*YL
16       XX(K,2) = ZK*XL-XK*ZL
17       XX(K,3) = XK*YL-YK*XL
18       XX(K,4) = 0.
19    10 CONTINUE
20       RETURN
21       END
```

```
 1  *DECK YYM
 2        SUBROUTINE YYM(J,L,K1,K2)
 3  *CALL BASE
 4  *CALL VARS1
 5  *CALL VARS2
 6  C
 7  C  ETA METRICS FORMED FOR A J,L LINE IN K
 8  C
 9        DO 10 K = K1,K2
10        XJ=XXI(L,14,K)
11        YJ=YXI(L,15,K)
12        ZJ=ZXI(L,16,K)
13        CALL DLMET(J,K,L,XL,YL,ZL)
14        YY(K,1) = ZJ*YL-YJ*ZL
15        YY(K,2) = XJ*ZL-XL*ZJ
16        YY(K,3) = YJ*XL-XJ*YL
17        YY(K,4) = 0.
18     10 CONTINUE
19        RETURN
20        END
```

```
1   *DECK ZERODQ
2         SUBROUTINE ZERODQ(I)
3   *CALL BASE
4   *CALL VARS1
5   *CALL BTRID
6   *CALL VARS2
7   C     DEFINE IMPLICIT OPERATOR MATRIX ELEMENTS TO YIELD DELTAQ=0
8   C     AT GRID POINTS WHERE LAGGED BOUNDARY CONDITIONS ARE TO BE USED
9      15 DO 30 N=1,5
10        DO 20 M=1,5
11        A(I,N,M)=0.
12        B(I,N,M)=0.
13     20 C(I,N,M)=0.
14        B(I,N,N)=1.
15     30 F(I,N)=0.
16    100 CONTINUE
17        RETURN
18        END
```

```
*DECK ZZM
      SUBROUTINE ZZM(J,K,L1,L2)
*CALL BASE
*CALL VARS1
*CALL SHOCKC
*CALL VARS2
C
C  ZETA METRICS FORMED FOR A J,K LINE IN L
C
C  SYMMETRY
C
      DO 10 L = L1,L2
      CALL DKMET(J,K,L,XK,YK,ZK)
C     CALL DJMET(J,L,XJ,YJ,ZJ)
      XJ=XXI(L,14,K)
      YJ=YXI(L,15,K)
      ZJ=ZXI(L,16,K)
      ZZ(L,1) = YJ*ZK-ZJ*YK
      ZZ(L,2) = XK*ZJ-XJ*ZK
      ZZ(L,3) = XJ*YK-YJ*XK
      ZZ(L,4) = 0.
   10 CONTINUE
      RETURN
      END
```

```
                NOZL3D - COMDECKS
 1  *COMDECK    CARDS
 2        COMMON /CARDS/
 3       A     ITEMS,     ITPREC,    KCARDS,    KDOREC,    KIRECS,
 4       B     LASCOL,    LSOUGT,    LVJUMP,    L1SENT,    L2SENT,    NILERR,
 5       C     IREC,      IDAT
 6         INTEGER        IREC(200), IDAT(200)
 7         REAL           REC(1)
 8         EQUIVALENCE    (IREC,REC)
 9  *COMDECK    CDMERR
10        COMMON /CDMERR/
11       A     DMERCD,    DMERCM,    DMERLC,    DMERPM,    IOMERH,    IEHSAV
12         INTEGER        DMERCD,    DMERCM,    DMERLC,    DMERPM
13        COMMON /CDMETS/
14       A     TRARGS,    TROPID,    TRINST,    TRARGL,
15       B     TRSTSZ,    TRTOPM,    TRTOPS,    TRSTAK
16         INTEGER        TRARGS,    TROPID,    TRINST,    TRARGL(10)
17         INTEGER        TRSTSZ,    TRTOPM,    TRTOPS,    TRSTAK(48)
18  *COMDECK    CDMERRA
19              USE /CDMERR/
20  DMERCD      BSS        1
21  DMERCM      BSS        1
22  DMERLC      BSS        1
23  DMERPM      BSS        1
24  IOMERH      BSS        1
25  IEHSAV      BSS        1
26              USE /CDMETS/
27  TRARGS      BSS        1
28  TROPID      BSS        1
29  TRINST      BSS        1
30  TRARGL      BSS        10
31  TRSTSZ      BSS        1
32  TRTOPM      BSS        1
33  TRTOPS      BSS        1
34  TRSTAK      BSS        48
35  *COMDECK    CDMASTA
36              USE        /CDMAST/
37  MAXLDI      SET        16D
38  ASTDIM      BSS        1
39              BSS        7               ASTOSD(1-7)
40  SIZREC      BSS        1               RECORD SIZE IN WORDS (N)
41  RETCOD      BSS        1               RETURN CODE (BITS 0-8 OF FET+0)
42  EOFCOD      BSS        0
43  EOICOD      BSS        1               END OF INFORMATION RETURN CODE
44  STATUS      BSS        1               OPERATION STATUS WORD
45  DTLERR      BSS        0               DETAILED ERROR CODE (NOS)
46  TAPERR      BSS        1               DETAILED TAPE ERROR (SCOPE)
47  RSKCNT      BSS        1               RESIDUAL SKIP COUNT (SCOPE)
48  NWRDXF      BSS        1               NUMBER OF WORDS XFERRED ON READ/WRITE
49  ASTCNT      BSS        7
50  ASTSEC      BSS        8
51              IFEQ       OS,SCOPE
52  ASTSYS      BSSZ       1               SYSTEM IDENTIFIER              (SCOPE)
53              ELSE
54  ASTSYS      DATA       1               SYSTEM IDENTIFIER               (NOS)
55              ENDIF
56  ASTMSG      BSS        9               MESSAGE TEXT AREA
57  DEVTYP      BSS        1
58  PRUSIZ      BSS        1
59  LFNADS      BSS        1
60  PRUXEI      BSS        1
61  NWXF        BSS        1
62  NWXWRT      BSS        1
63  OUTMIN      BSS        1               (OUT-IN) ON EXIT FROM FETRET$
64              BSS        6               SCRATCH
65  FET         BSS        9               FET PROPER
66  FETEXT      BSS        3               FET EXTENSION (SCOPE)
67  ASTQFR      BSS        MAXLDI          QUALIFIERS (USER IDS, OWNERS IDS)
68  ASTPFN      BSS        MAXLDI          PERMANENT FILENAMES
69  ASTLFN      BSS        MAXLDI          LOGICAL FILENAMES
70  ASTEQC      BSS        MAXLDI          EQUIPMENT CODES
71  ASTOPT      BSS        MAXLDI          ACCESSIBILITY/PERMANENCY OPTIONS
72  ASTYPE      BSS        MAXLDI          GEN EQUIPMENT TYPE INDICES
73  ASTUNT      BSS        MAXLDI          UNIT NUMBERS (LEFT FOR COMPATIB)
74  ASTLOC      BSS        MAXLDI          CURRENT DEVICE LOCATIONS
75  ASTNXT      BSS        MAXLDI          NEXT (EOI) DEVICE LOCATIONS
76  ASTLIM      BSS        MAXLDI          DEVICE CAPACITIES
77  ASTWXR      BSS        MAXLDI          COUNTS OF WORDS READ
78  ASTWXW      BSS        MAXLDI          COUNTS OF WORDS WRITTEN
79  *COMDECK    DALCOM
80  C
81        COMMON /CDMDAL/
82       $     LDILIB(26),
83       $     LIBLDI(4),LIBHDR(4),LIBLIN(4),LIBNSG(4),
84       $     LIBLOC(4),LIBNXT(4),LIBOPR(4),LIBSEG(4),
85       $     LIBSEQ(4),LIBWRT(4),LININP(16),          LINTOC(16),
86       $     MAXDAL,    MCTSEG,    MWHSEG,    MWTSEG,    NAMKEY(4),
```

```
          NOZL3D - COMDECKS
     $    NCTSEG,   NRTSEG,   NTLINE,   NWLHDR,   NWTSEG
C
      COMMON /SYMBIO/
     A    CRDFIL,   ERRFIL,   MCHLIN,   MTWLIN,
     B    PLTFIL,   PPLFIL,   PRTFIL,   PUNFIL,   SYSCRD,
     C    SYSPRT,   TTYINP,   TTYPRT,   TXTFMT,   ZIOSCR
      INTEGER       CRDFIL,   ERRFIL,   MCHLIN,   MTWLIN
      INTEGER       PLTFIL,   PPLFIL,   PRTFIL,   PUNFIL,   SYSCRD
      INTEGER       SYSPRT,   TXTFMT(5),ZIOSCR(96)
      LOGICAL       TTYINP,   TTYPRT
C
      COMMON //     IPOOL(1)
      REAL          POOL(1)
      DOUBLE PRECISION        DPOOL(1)
      EQUIVALENCE   (IPOOL,POOL,DPOOL)
*COMDECK    DALTIT
C*****************************************************************************
C*    N O S T R A   D A T A   M A N A G E M E N T   S Y S T E M              *
C*                                                                           *
C*    E Z - D A L    BASIC-LEVEL MANAGER OF DIRECT ACCESS LIBRARIES          *
C*****************************************************************************
*COMDECK    DMECOM
      COMMON /CDMERR/
     A    DMERCD,   DMERCM,   DMERLC,   DMERPM,   IOMERH,   IEHSAV
      INTEGER       DMERCD,   DMERCM,   DMERLC,   DMERPM
      COMMON /CDMETS/
     A    TRARGS,   TROPID,   TRINST,   TRARGL,
     B    TRSTSZ,   TRTOPM,   TRTOPS,   TRSTAK
      INTEGER       TRARGS,   TROPID,   TRINST,   TRARGL(10)
      INTEGER       TRSTSZ,   TRTOPM,   TRTOPS,   TRSTAK(48)
*COMDECK    IOMACTL
**********************************
*  ASSEMBLY CONTROL SPECIFICATIONS *
**********************************
SCOPE     EQU       0             *
NOS       EQU       1             *
OS        SET       NOS           *
          SYSCOM    B1            *
*         LIST      S             *
*COMDECK    IOMCOM
C
      COMMON  /CDMAST/        ASTDIM,
     A    ASTOSD,   ASTCNT,   ASTSEC,   ASTSYS,   ASTMSG,   ASTPKT,
     B    ASTQFR,   ASTPFN,   ASTLFN,   ASTEQC,   ASTOPT,   ASTYPE,
     C    ASTUNT,   ASTLOC,   ASTNXT,   ASTLIM,   ASTWXR,   ASTWXW
      INTEGER       ASTDIM,   ASTOSD(14), ASTCNT(7), ASTSEC(8)
      INTEGER       ASTSYS,   ASTMSG(9),ASTPKT(25)
      INTEGER       ASTQFR(16), ASTPFN(16), ASTLFN(16), ASTEQC(16)
      INTEGER       ASTUNT(16), ASTOPT(16), ASTYPE(16)
      INTEGER       ASTLOC(16), ASTNXT(16), ASTLIM(16)
      INTEGER       ASTWXR(16), ASTWXW(16)
      EQUIVALENCE   (IDOPER,ASTOSD(1)), (IOERCD,ASTOSD(2))
*COMDECK    RPMDIB
C
      COMMON /CDMDAT/
     A    ASPBEG,   ASPEND,   ASPLDI,   BOOTNG,
     B    IDXCAT,   IDXLAT,   IDXGAT,   IDXRAT,
     C    KEYCAT,   KEYLAT,   KEYGAT,   KEYRAT,
     D    GIDBUF,   GIDDMS,   GIDTEM,
     E    MSKGID,   MSKLOC,   MSKRID,
     F    RPDIND,   RPDFIX,   RPDNAM,   RPDNUM,
     G    TIMBEG,   TIMDMS,   TIMING,   TYPTAB,
     H    UPCALL,   UPGREF
      INTEGER       ASPBEG,   ASPEND,   ASPLDI
      INTEGER       GIDBUF,   GIDDMS,   GIDTEM
      INTEGER       GIDRES(3),IDXTAB(4),KEYTAB(4),RIDRES(4)
      INTEGER       RPDIND,   RPDFIX,   RPDNAM,   RPDNUM
      INTEGER       RPDTAB(4),TYPTAB(4),UPCALL
      LOGICAL       BOOTNG,   TIMING,   UPGREF
      EQUIVALENCE   (IDXTAB(1),IDXCAT), (RPDTAB(1),RPDIND)
      EQUIVALENCE   (GIDRES(1),GIDBUF), (RIDRES(1),KEYTAB(1),KEYCAT)
*COMDECK    RPMDAT
      DATA          ASPBEG, ASPEND, ASPLDI /18,32,0/
      DATA          BOOTNG /.TRUE./
      DATA          IDXCAT,IDXLAT,IDXGAT,IDXRAT /1,2,3,4/
      DATA          KEYCAT,KEYLAT,KEYGAT,KEYRAT/3HCAT,3HLAT,3HGAT,3HRAT/
      DATA          GIDBUF,GIDDMS,GIDTEM  /4H$BUF,4H$DMS,4H$TEM/
      DATA          MSKGID, MSKRID /2*777777770000000000008/
      DATA          MSKLOC  /77777777B/
      DATA          RPDTAB / 2, 1, 3, 3/
      DATA          TYPTAB /3RIND, 3RFIX, 3RNAM, 3RNUM/
      DATA          TIMBEG,TIMDMS,TIMING,UPCALL/0.,0.,.FALSE.,0/
      DATA          UPGREF /.FALSE./
*COMDECK    RPMTIT
C*****************************************************************************
C*    N O S T R A   D A T A   M A N A G E M E N T   S Y S T E M              *
C*                                                                           *
```

```
            NOZLIC -
C*    R P M          R E S O U R C E   P O O L   M A N A G E R          *
C*****************************************************************
*COMDECK    SYMBIO
      COMMON /SYMBIO/
     A    CRDFIL,   ERRFIL,   MCHLIN,   MTWLIN,
     B    PLTFIL,   PPLFIL,   PRTFIL,   PUNFIL,   SYSCRD,
     C    SYSPRT,   TTYINP,   TTYPRT,   TXTFMT,   ZIOSCR
       INTEGER       CRDFIL,   ERRFIL,   MCHLIN,   MTWLIN
       INTEGER       PLTFIL,   PPLFIL,   PRTFIL,   PUNFIL,   SYSCRD
       INTEGER       SYSPRT,   TXTFMT(5),ZIOSCR(96)
       LOGICAL       TTYINP,   TTYPRT
```

```
            NOZL3D -        DMGASP
 1  *DECK       DMGASP
 2  C=DECK      DMGASP      DMGASP      MIXED
 3        SUBROUTINE    DM GASP
 4       $      (ARG1, ARG2, ARG3)
 5  C
 6  C=PURPOSE   ACCESS METHOD OF NOSTRA-DMS
 7  C=AUTHOR    C. A. FELIPPA
 8  C=VERSION   NOVEMBER 1977
 9  C=EQUIPMENT CDC
10  C=KEYWORDS  AUXILIARY   STORAGE     MANAGER     I/O
11  C=KEYWORDS  DATA        MANAGEMENT SYSTEM
12  C=EASY-SUB  DMABRT      LFNBF       LFNZF       IOMAPF      IOMCLS
13  C=EASY-SUB  IOMCPF      IOMDPF      IOMEOF      IOMEPF      IOMEVT
14  C=EASY-SUB  IOMFET      IOMOPN      IOMPOD      IOMPOT      IOMPRU
15  C=EASY-SUB  IOMPPF      IOMQFC      IOMRPF      IOMRDR      IOMWTR
16  C=EASY-SUB  IOMTAB      IOMXEI
17  C=TEST      TESTCIO     TESTPFM
18  C=USAGE     REFER TO DMGASP REFERENCE MANUAL, LMSC-D626839
19  C
20  C                   C O M M O N
21  C
22  C=PROCEDURE IOMCOM      CDMETS      CDMERR
23  *CALL               IOMCOM
24  *CALL               DMECOM
25  C
26  C                   T Y P E   A N D   D I M E N S I O N
27  C
28        INTEGER       ARG1,     ARG2(2),  ARG3(4)
29        INTEGER       CDLOC,    DEVICX,   DEVTYP,   EDN(2),   EOFCOD
30        INTEGER       QFC(3),   REEL,     RETCOD,   RING,     RSKCNT
31        INTEGER       EQCODE,               OPTX,     OPTXA
32        INTEGER       PFN,      PFNID,    PFNCY,    PFNRP,    PFNXR
33        INTEGER       SECTOR,   SIZREC,   STATUS,   TAPERR,   TYPEX
34        INTEGER       TYPIDX,               VRN
35  C
36  C                   E Q U I V A L E N C E
37  C
38        EQUIVALENCE   (IDOPER,ASTOSD(1)),  (IOERCD,ASTOSD(2))
39        EQUIVALENCE   (DEVICX,ASTOSD(3)),  (TYPEX, ASTOSD(4))
40        EQUIVALENCE   (LCARG1,ASTOSD(5)),  (LCARG2,ASTOSD(6))
41        EQUIVALENCE   (LOCDEV,ASTOSD(7)),  (SIZREC,ASTOSD(8))
42        EQUIVALENCE   (RETCOD,ASTOSD(9)),  (EOFCOD,ASTOSD(10))
43        EQUIVALENCE   (STATUS,ASTOSD(11)), (TAPERR,ASTOSD(12))
44        EQUIVALENCE   (RSKCNT,ASTOSD(13)), (NWRDXF,ASTOSD(14))
45        EQUIVALENCE   (DEVTYP,ASTPKT(1)),  (SECTOR,ASTPKT(2))
46        EQUIVALENCE   (QFC,PFNID), (QFC(2),PFN),  (QFC(3),PFNCY)
47  C
48  C                   D A T A   I N I T I A L I Z A T I O N
49  C
50        DATA          ASTDIM  /16/
51        DATA          (ASTCNT(J),J=1,7)  /7*0/
52        DATA          (ASTEQC(J),J=1,16) /16*0/
53        DATA          (ASTLFN(J),J=1,16)
54       A       /5LTAPE1, 5LTAPE2, 5LTAPE3, 5LTAPE4, 5LTAPE7, 5LTAPE8,
55       B        5LTAPE9, 6LTAPE10,6LTAPE11,6LTAPE12,6LTAPE13,6LTAPE14,
56       C        6LTAPE15,6LTAPE16,6LTAPE17,6LTAPE18/
57        DATA          (ASTOSD(J),J=1,14) /1H ,13*0/
58        DATA          (ASTPFN(J),J=1,16) /16*0/
59        DATA          (ASTSEC(J),J=1,8)  /4*0,64,64,1,1/
60        DATA          (ASTUNT(J),J=1,16)
61       A    /1, 2, 3, 4,       7, 8, 9,10,11,12,13,14,15,16,17,18/
62        DATA          (ASTYPE(J),J=1,16) /16*4/
63        DATA          (ASTWXR(J),J=1,16) /16*0/
64        DATA          (ASTWXW(J),J=1,16) /16*0/
65        DATA          PFNRP /30/
66        DATA          DMERCD, DMERCM, DMERLC, DMERPM, IOMERH /5*0/
67  C
68  C
69  C              INITIALIZATION/CHECKOUT CODE BLOCK
70  C              COMMON TO ALL ENTRY POINTS
71  C
72    100 CONTINUE
73        ASSIGN 250 TO  LJ DEVX
74    150 CONTINUE
75        DO 160  I = 2,14
76          ASTOSD(I) = 0
77    160   CONTINUE
78        DEVICX =   ARG1
79        LDI =      DEVICX
80        IF (LDI)                                6100,6100, 180
81    180 IF (LDI - ASTDIM)                        200, 200,6100
82    200 CONTINUE
83        TYPEX =    ASTYPE(LDI) - 4
84        TYPIDX =   TYPEX
85        SECTOR =   ASTSEC(TYPEX+5)
86        EQCODE =   ASTEQC(LDI)
```

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                NOZL3D          DMGASP
 87         LFN =       ASTLFN(LDI)
 88         PFN =       ASTPFN(LDI)
 89         PFNID =     ASTQFR(LDI)
 90         OPTX =      ASTOPT(LDI)
 91         OPTXA =     IABS(OPTX)
 92         GO TO    LJ DEVX,  (250, 1000, 1800)
 93     250 CONTINUE
 94         NEXT =      ASTNXT(LDI)
 95         LIMIT =     ASTLIM(LDI)
 96         CDLOC =     ASTLOC(LDI)
 97         LOCDEV      CDLOC
 98         LOCREC      LOCDEV + 1
 99         NEWLOC      LOCREC
100 C
101 C                VERIFY DEVICE IS ACTIVE
102 C
103         IF (EQCODE .EQ. 0)                  GO TO 6200
104         GO TO    LJ TASK,  (800, 1200, 2500, 3000, 3500, 4000)
105     800 CONTINUE
106 C
107 C=ENTRY      DMDAST      DMDAST    ENTRY
108 C=USAGE      SEE SECTION 3.1 OF DMGASP REF. MNANUAL, LMSC-D626839
109 C=PURPOSE    DECLARE (ASSIGN, OPEN) AN AUXILIARY STORAGE DEVICE
110 C=USAGE      SEE SECTION 3.1 OF DMGASP REF. MANUAL, LMSC-D626839
111 C
112 C      **********************
113         ENTRY          DMDAST
114 C      **********************
115 C
116         IDOPER =    6HDMDAST
117         ASSIGN 1000 TO  LJ DEVX
118         GO TO 150
119    1000 CONTINUE
120 C
121 C                IF DEVICE IS CURRENTLY ACTIVE, CLOSE IT, THEN OPEN
122 C
123         IF (EQCODE .EQ. 0)                  GO TO 1100
124         ASSIGN  1100 TO  LJ FAST
125         GO TO 1900
126    1100 CONTINUE
127         EDN(1) =    ARG2(1)
128         EDN(2) =    ARG2(2)
129         TYPEX =     ARG3(1)
130         OPTX =      ARG3(2)
131         OPTXA =     IABS(OPTX)
132         LIMIT =     ARG3(3)
133         IF (LIMIT .LE. 0)                   LIMIT =  262144
134         REEL =      ARG3(4)
135         IF (REEL .EQ. IH )                  REEL = 0
136         SECTOR =    ASTSEC(TYPEX+5)
137         NEXT =      0
138 C
139 C                IF EDNAME IS NZ, PROCESS SUPPLIED IDENTIFIER
140 C
141         CALL        IOM QFC  (EDN,  QFC)
142 C
143 C                BRANCH ACCORDING TO EQUIPMENT REQUEST INDEX
144 C
145         NTRKS =     7
146         IF (TYPEX+1)                        1200,1250,1400
147 C
148 C                  --------------------
149 C                  MAGNETIC TAPE DEVICE
150 C                  --------------------
151 C
152    1200 CONTINUE
153         NTRKS =     9
154    1250 CONTINUE
155         RING =      0
156         IF (IABS(OPTX)-1)                   1280,1300,1320
157    1280 CONTINUE
158         REEL =      1
159    1300 CONTINUE
160         RING =      1
161    1320 CONTINUE
162 C       CALL        IOM RMT  (LFN, VRN, RING, 0, NTRKS, 0)
163         GO TO 1600
164 C
165 C                  --------------------
166 C                  DIRECT ACCESS DEVICE
167 C                  --------------------
168 C
169    1400 CONTINUE
170         LFN =       ASTLFN(LDI)
171         IF (PFN .EQ. 0)                     GO TO 1420
172         IF (REEL .NE. 0)                    LFN = LFNZF(REEL)
173    1420 CONTINUE
```

```
            NOZL3D -        DMGASP
C
      IF (TYPEX - 2)                        1440,7100,7100
 1440 CONTINUE
C
C               SECTOR-ADDRESSABLE MASS STORAGE
C
      IF (OPTXA .LE. 2)                     GO TO 1500
      PFN =       AND(PFN,-777777B) .OR. PFNCY .OR. 64*PFNRP
      ASTPFN(LDI) = PFN
C
C               ATTACH PERM FILE TO RUN IF OPTX = 3,4
C
      MODE =      OPTXA - 4
      IF (MODE .GT. 0)                      GO TO 1450
      IF (ASTSYS .NE. 0)                    MODE = IABS(MODE)
      CALL        IOM APF  (LFN, PFN, PFNID, MODE)
      IF (STATUS .NE. 0)                    GO TO 7100
      NEXT =      IOM FRU  (LFN)
      GO TO 1500
C
C               IF NEW PERM FILE REQUESTED (OPTX GT 5), ISSUE A
C               EQUIPMENT REQUEST ON SCOPE, OR A DEFINE REQUEST ON NOS
C
 1450 CONTINUE
      IF (ASTSYS .EQ. 0)                    CALL  IOM RPF  (LFN)
      MCT =       MOD(OPTXA+1,2)+2
      IF (ASTSYS .NE. 0)                    CALL  IOM DPF (LFN, PFN, MCT, 0)
      IF (STATUS .NE. 0)                    GO TO 7100
C
C               OPEN FILE
C
 1500 CONTINUE
      CALL        IOM OPN  (LFN)
C
 1550 CONTINUE
 1600 CONTINUE
C
C               INSERT DEVICE DESCRIPTORS IN AUX STORAGE TABLE
C
C
C   TEMPORARY FIX TO DMGASP    JAN1980
C    TO ALLEVIATE PROBLEM WITH CHANGE IN
C    EQUIPMENT CODES ON THE NOS SYSTEM
C
      DEVTYP=1
      ASTPFN(LDI) = LFN
      ASTQFR(LDI) = PFNID
      ASTPFN(LDI) = PFN
      ASTLFN(LDI) = LFN
      ASTEQC(LDI) = DEVTYP
      ASTYPE(LDI) = TYPEX + 4
      ASTOPT(LDI) = OPTXA
      ASTLIM(LDI) = LIMIT
      ASTLOC(LDI) = 0
      ASTNXT(LDI) = NEXT
      ASTWXR(LDI) = 0
      ASTWXW(LDI) = 0
      GO TO 5000
C
C=ENTRY     DMFAST      DMFAST    ENTRY
C=PURPOSE   FREE (CLOSE, DEACTIVATE) AN AUXILIARY STORAGE DEVICE
C=USAGE     SEE SECTION 3.2 OF DMGASP REF. MANUAL, LMSC-D626839
C
C     ++++++++++++++++++++++
      ENTRY         DM F AST
C     ++++++++++++++++++++++
C
      IDOPER =    6HDMFAST
      ASSIGN 5000 TO  LJ FAST
      ASSIGN 1800 TO  LJ DEVX
      GO TO 150
 1800 CONTINUE
C
      IF (ARG2(1))                          1850,1900,1950
C
C               EVICT CONTENTS OF FILE (ERASE)
C
 1850 CONTINUE
      CALL        IOM EVT  (LFN)
      AST*NXT(LDI) =  0
      GO TO 5000
C
C               RELEASE FILE FROM JOB (FREE DEVICE).  IF OPTX GE 5,
C               CATALOG NEW PERM FILE IF ON SCOPE.
C
 1900 CONTINUE
      IF (ASTSYS .NE. 0)                    GO TO 1930
```

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            NOZL3D -        DMGASP
261         IF (OPTXA .LE. 2)                   GO TO 1930
262         IF (OPTXA .GE. 5)                   GO TO 1920
263         IF (ASTWXW(LDI) .NE. 0)
264        $CALL        IOM EPF  (LFN, PFN, 0, 0)
265         GO TO 1930
266    1920 CONTINUE
267         PFNXR =     0
268         CALL        IOM CPF  (LFN, PFN, PFNID, PFNXR)
269         IF (STATUS .NE. 0)                  GO TO 7100
270    1930 CONTINUE
271    C
272    C               CLOSE FILE
273    C
274         CALL        IOM CLS  (LFN)
275         ASTEQC(LDI) = 0
276         ASTPFN(LDI) = 0
277         GO TO    LJ FAST, (1100, 5000)
278    C
279    C               PURGE PERMANENT FILE (DECATALOGUE)
280    C
281    1950 CONTINUE
282         CALL        IOM PPF  (LFN, PFN, 0, 0)
283         ASTEQC(LDI) = 0
284         ASTPFN(LDI) = 0
285         GO TO 5000
286    C
287    C=ENTRY     DMPAST      DMPAST    ENTRY
288    C=PURPOSE   POSITION AUXILIARY STORAGE DEVICE
289    C=USAGE     SEE SECTION 3.3 OF DMGASP REF. MANUAL, LMSC-D626839
290    C
291    C      ++++++++++++++++++++++
292           ENTRY          DM P AST
293    C      ++++++++++++++++++++++
294    C
295           IDOPER =    6HDMPAST
296           ASSIGN 2500 TO  LJ TASK
297           GO TO 100
298    2500 CONTINUE
299           LCARG1 =    ARG2(1)
300           LCARG2 =    ARG3(1)
301           IF  (TYPEX .GE. 0)                  GO TO 2800
302    C
303    C               POSITION MAGNETIC TAPE
304    C
305    C      CALL        IOM POT  (LFN, LOCDEV, LCARG1, LCARG2)
306           ASTLOC(LDI) = LOCDEV
307           IF (STATUS)                         6400,5000,6400
308    C
309    C                POSITION DIRECT ACCESS DEVICE
310    C
311    2800 CONTINUE
312           CALL        IOM POD   (LOCDEV, LCARG1, LCARG2, SECTOR)
313           IF (LOCDEV)                         6500,2900,2900
314    2900 IF (LOCDEV - LIMIT)                   2950,2950,6500
315    2950 ASTLOC(LDI) = LOCDEV
316           GO TO 5000
317    C
318    C=ENTRY     DMRAST      DMRAST    ENTRY
319    C=PURPOSE   READ RECORD FROM AUXILIARY STORAGE DEVICE
320    C=USAGE     SEE SECTION 3.4 OF DMGASP REF. MANUAL, LMSC-D626839
321    C
322    C      ++++++++++++++++++++++
323           ENTRY          DM R AST
324    C      ++++++++++++++++++++++
325    C
326           IDOPER =    6HDMRAST
327           ASSIGN 3000 TO  LJ TASK
328           GO TO 100
329    3000 CONTINUE
330           SIZREC  =   ARG3(1)
331           IF (SIZREC)                         6600,6600,3100
332    3100 CONTINUE
333           IF (SECTOR .EQ. 0)                  GO TO 3200
334           NEWLOC =    NEWLOC + (SIZREC-1)/SECTOR
335           IF (NEWLOC - NEXT)                  3200,3200,6700
336    3200 CONTINUE
337    C
338    C               READ DEVICE AND CHECK STATUS WORD
339    C
340           CALL        IOM RDR  (LFN, ARG2, SIZREC, LOCREC, TYPEX)
341           IF (STATUS .GT. 1)                  GO TO 7000
342    C
343    C               UPDATE DEVICE STATE AND ACCOUNTING PARAMETERS
344    C
345           ASTCNT(5) =    ASTCNT(5) + 1
346           ASTWXR(LDI) = ASTWXR(LDI) + SIZREC
347           GO TO 3900
```

```
C
C=ENTRY     DMWAST      DMWAST    ENTRY
C=PURPOSE   WRITE RECORD ON AUXILIARY STORAGE DEVICE
C=USAGE     SEE SECTION 3.5 OF DMGASP REF. MANUAL, LMSC-D626839
C
C     ++++++++++++++++++++++
      ENTRY         DM W AST
C     ++++++++++++++++++++++
C
      IDOPER =   6HDMWAST
      ASSIGN 3500 TO  LJ TASK
      GO TO 100
 3500 CONTINUE
      SIZREC =   ARG3(1)
      IF (SIZREC)                          6600,6600,3550
 3550 CONTINUE
      IF (OPTXA .EQ. 3)                    GO TO 6900
      IF (SECTOR .EQ. 0)                   GO TO 3800
      NEWLOC =   NEWLOC + (SIZREC-1)/SECTOR
      IF (NEWLOC .GT. LIMIT)               GO TO 6800
      IF (TYPEX .EQ. 3)                    GO TO 3800
C
C             IF RECORD IS TO BE WRITTEN BEYOND CURRENT EOI ON
C             MASS STORAGE DEVICE, EXTEND EOI BY DUMMY WRITES
C
      MORE =     LOCDEV - NEXT
      IF (MORE)                                3800,3700,3600
 3600 CONTINUE
      CALL       IOM XEI  (LFN, MORE)
 3700 CONTINUE
      LOCREC =   0
 3800 CONTINUE
      CALL       IOM WTR  (LFN, ARG2, SIZREC, LOCREC, TYPEX)
      IF (STATUS .GT. 1)                   GO TO 7000
C
C             UPDATE DEVICE STATE AND ACCOUNTING PARAMETERS
C
      ASTCNT(4) =   ASTCNT(4) + 1
      ASTWXW(LDI) = ASTWXW(LDI) + SIZREC
 3900 CONTINUE
      ASTLOC(LDI) = NEWLOC
      ASTNXT(LDI) = MAX0 (NEWLOC,NEXT)
      ASTCNT(6) =   ASTCNT(6)   + SIZREC
      ASTCNT(7) =   ASTCNT(7)   + NWRDXF
      GO TO 5000
C
C=ENTRY     DMEAST      DMEAST    ENTRY
C=PURPOSE   WRITE EOF ON MAGNETIC TAPE
C=USAGE     SEE SECTION 3.6 OF DMGASP REF. MANUAL, LMSC-D626839
C
C     ++++++++++++++++++++++
      ENTRY         DM E AST
C     ++++++++++++++++++++++
C
      IDOPER =   6HDMEAST
      ASSIGN 4000 TO  LJ TASK
      GO TO 100
 4000 CONTINUE
C
C             WRITE TWO END-OF-FILE MARKS AND BACKSPACE TAPE
C             OVER LAST ONE
C
C     CALL       WRTEOF    (LFN)
C     CALL       WRTEOF    (LFN)
C     CALL       BSKIPF    (LFN, 1)
C
C             UPDATE DEVICE LOCATION
C
      LOCDEV =   AND (LOCDEV,770000B) + 1000B
      ASTLOC(LDI) = LOCDEV
      ASTNXT(LDI) = LOCDEV
      GO TO 5000
C
C
C=ENTRY     DMLAST      DMLAST    ENTRY
C=PURPOSE   LIST IOM INFORMATION
C=USAGE     SEE SECTION 3.7 OF DMGASP REF. MANUAL, LMSC-D626839
C
C     ++++++++++++++++++++++
      ENTRY         DM L AST
C     ++++++++++++++++++++++
C
      IF (ARG1 .NE. 0)                     CALL  IOM OSD
      IF (ARG2(1) .NE. 0)                  CALL  IOM FET
      IF (ARG3(1) .NE. 0)                  CALL  IOM TAB
      GO TO 5000
C
```

```
                NOZL3D -        DMGASP
435  C=ENTRY      DMNAST       DMNAST    ENTRY
436  C=PURPOSE    CHANGE INTERNAL FILE NAME(S)
437  C=USAGE      SEE SECTION 5.2 OF DMGASP REF. MANUAL, LMSC-D626839
438  C
439  C      ++++++++++++++++++++++
440         ENTRY          DM N AST
441  C      ++++++++++++++++++++++
442  C
443         ASTLFN(LDI) = LFNZF(ARG3(1).AND.MASK(42))
444         NLDI =      ARG2(1) - 1
445         IF (NLDI .LE. 0)                    GO TO 5000
446         DO 4600  J = 1,NLDI
447   4600    ASTLFN(LDI+J) =  LFNINC(ASTLFN(LDI+J-1))
448  C
449   5000 CONTINUE
450         RETURN
451  C
452  C               -----------
453  C               ERROR EXITS
454  C               -----------
455  C
456  C               ILLEGAL DEVICE INDEX
457  C
458   6100 IOERCD =   1
459         GO TO 8000
460  C
461  C               ATTEMPT TO POSITION, READ OR WRITE INACTIVE DEVICE
462  C
463   6200 IOERCD =   2
464         GO TO 8000
465  C
466  C               RESERVED ERROR CODE
467  C
468  C6300 IOERCD =   3
469  C      GO TO 8000
470  C
471  C               ILLEGAL TAPE POSITIONING
472  C
473   6400 IOERCD =   4
474         GO TO 8000
475  C
476  C                ILLEGAL MASS STORAGE / ECS POSITIONING
477  C
478   6500 IOERCD =   5
479         GO TO 8000
480  C
481  C               ILLEGAL RECORD SIZE
482  C
483   6600 IOERCD =   6
484         GO TO 8000
485  C
486  C               ATTEMPT TO READ MASS STORAGE AREA BEYOND EOI
487  C
488   6700 IOERCD =   7
489         GO TO 8000
490  C
491  C               DEVICE OVERFLOW ON WRITE OP
492  C
493   6800 IOERCD =   8
494         ASTLIM(LDI) = -ASTLIM(LDI)
495         GO TO 8000
496  C
497  C               ATTEMPT TO WRITE ON PROTECTED FILE
498  C
499   6900 IOERCD =   9
500         GO TO 8000
501  C
502  C               MISCELLANEOUS ERROR DETECTED BY I/O HANDLER
503  C
504   7000 IOERCD =   10
505         GO TO 8000
506  C
507  C               UNABLE TO HONOR CONTROL CARD REQUEST
508  C
509   7100 IOERCD =   11
510         GO TO 8000
511  C
512  C               CONTROL CARD FORMAT ERROR
513  C
514  C7200 CONTINUE
515  C
516  C               POSTMORTEM ERROR PROCEDURE
517  C
518   8000 CONTINUE
519         IF (IOMERH - 1)                  5000,8500,8500
520   8500 CONTINUE
521         CALL        IOM OSD
```

```
522         IF (IOERCD .GE. 10)             CALL  IOM FET
523         IF (IOMERH .GE. 2)              CALL  IOM TAB
524         IF (IOMERH .GE. 3)              CALL  DM ABRT
525         CALL        IOFATE
526         GO TO 5000
527         END
```

```
                NOZL3D -        IOMCIO
  1  *DECK         IOMCIO
  2  * =DECK       IOMCIO      IOMCIO      ASSEMBLY
  3                IDENT       IOMCIO
  4                TITLE       COMBINED INPUT/OUTPUT FUNCTIONS
  5                SPACE       3
  6  *CALL         IOMACTL
  7                IFEQ        OS,NOS          *
  8  ************************************                                  (NOS)
  9  *    EXTERNAL TEXT COMMON DECKS     *                                (NOS)
 10  ************************************                                  (NOS)
 11  *            LIST        X           *                               (NOS)
 12               XTEXT       COMCCIO     *  I/O REQUEST PROCESSOR        (NOS)
 13               XTEXT       COMCLFM     *  LOCAL FILE MANAGER REQUESTS  (NOS)
 14               XTEXT       COMCSYS     *  SYSTEM REQUEST ROUTINES      (NOS)
 15               ENDIF       *
 16  ************************************
 17  COMMON       SPACE       2
 18  ***          COMMON BLOCK DECLARATIONS
 19  *
 20  *
 21  * =PROCEDURE CDMASTA      CDMERRA     CDMETSA
 22  *CALL          CDMASTA
 23  *CALL          CDMERRA
 24               USE         /CDMPAD/
 25  BUFSIZ       SET         300B
 26  BUFPRU       SET         BUFSIZ/100B
 27  CMSIZ        BSSZ        1               CURRENT CM FL
 28  BCSIZ        BSS         1               BLANK COMMON SIZE
 29  REQCM        BSS         1               REQUESTED CM FL
 30  LWAREC       BSS         1
 31  PAD          BSS         0
 32  PADDING      BSS         0
 33  BUFFER       BSS         BUFSIZ          UTILITY BUFFER AREA
 34               USE         //
 35  BCFWA        BSS         1
 36  *
 37               USE         0
 38               SPACE       3
 39  SYSREQ       TITLE       MISCELLANEOUS SYSTEM ACTION REQUESTS
 40  ********************************************************************
 41  *                                                                  *
 42  *            MISCELLANEOUS REQUESTS ISSUED TO MONITOR              *
 43  *                                                                  *
 44  *            AUTHOR -  C. A. FELIPPA, NOV 1975                     *
 45  *            UPDATE -  OCTOBER 1977  (SCOPE/NOS)                   *
 46  *                                                                  *
 47  ********************************************************************
 48  *                                                                  *
 49  *            AN ENTRY POINT SUMMARY FOLLOWS.                       *
 50  *                                                                  *
 51  *            DMABRT    CAUSES ERROR TERMINATION OF JOB             *
 52  *                                                                  *
 53  *            DMCLOK    RETURNS CURRENT READING OF SYSTEM CLOCK IN  *
 54  *                      DISPLAY CODE FORMAT HH.MM.SS                *
 55  *                                                                  *
 56  *            DMCMFL    TO ADJUST CENTRAL MEMORY FIELD LENGTH (CM FL)*
 57  *                      OR TO REQUEST INFORMATION ON CURRENT CM FL. *
 58  *                                                                  *
 59  *            DMCMFL$   COMPASS-CALLABLE, REGISTER-RESTORING VERSION*
 60  *                      OF DMCMFL.                                  *
 61  *                                                                  *
 62  *            DMDATE    RETURNS CURRENT DATE IN DISPLAY CODE FORMAT *
 63  *                      MM/DD/YY  AND CLOCK READING  HH.MM.SS       *
 64  *                                                                  *
 65  *            DMRUNT    RETURNS CP TIME USED BY JOB.  ON SCOPE, IT  *
 66  *                      ALSO RETURNS IO TIME AND CP TIME LIMIT.     *
 67  *                                                                  *
 68  ********************************************************************
 69  DMABRT       SPACE       2
 70  ***          DMABRT
 71  *
 72  *            ENTRY POINT TO FORCE ABNORMAL JOB TERMINATION
 73  *
 74  *            FORTRAN REFERENCE&
 75  *
 76  *            CALL        DMABRT
 77  *
 78               ENTRY       DMABRT
 79  DMABRT       BSS         1               ENTRY POINT
 80               ABORT                       LASCIATE OGNI SPERANZA
 81  *                                        VOI CHE ENTRATE
 82  DMCLOK       SPACE       2
 83  ***          DMCLOK (TIME)
 84  *
 85  *            ENTRY POINT TO READ SYSTEM CLOCK
 86  *
```

```
                NOZL3D -        IOMCIO
 87  *          CALL    DMCLOK  (TIME)
 88  *
 89  *          TIME        CURRENT CLOCK READING IN DISPLAY CODE FORMAT
 90  *                      HH.MM.SS  (OR *HH.MM.SS IF ELAPSED TIME SINCE
 91  *                      DEADSTART IS RETURNED)
 92  *
 93                  ENTRY   DMCLOK
 94  DMCLOK      BSS     1
 95                  BX5     X1              (X5) = ADDRESS(TIME)            (FTN)
 96                  SB1     1
 97                  CLOCK   TIMLOC          CLOCK MACRO
 98                  SA1     TIMLOC
 99                  BX6     X1
100                  SA6     X5              STORE TIME
101                  EQ      DMCLOK          RETURN TO CALLING PROGRAM
102  TIMLOC      EQU     PAD+174B
103  DMCMSZ      SPACE   2
104  ***         DMCMSZ  (REQCM, CMSIZ, BCSIZ)
105  *
106  *           ENTRY POINT TO MODIFY CENTRAL MEMORY FIELD LENGTH, OR
107  *           TO GET INFORMATION ABOUT CM FIELD LENGTH.
108  *
109  *           FORTRAN REFERENCE -
110  *
111  *           CALL        DMCMSZ  (REQCM, CMSIZ, BCSIZ)
112  *
113  *           WHERE
114  *
115  *           REQCM       DESIRED NEW CM FL IN WORDS IF REQUESTING CORE
116  *                       EXPANSION OR CONTRACTION.  ZERO TO REQUEST
117  *                       INFORMATION ABOUT CURRENT CMSIZ/BCSIZ.
118  *
119  *           CMSIZ       CENTRAL MEMORY FL ON EXIT FROM THIS ROUTINE.
120  *                       IF REQCM GT 0, AND THE REQUEST IS SUCCESSFUL,
121  *                       CMFL IS REQCM ROUNDED UP TO NEAREST 100B MULTIPLE.
122  *
123  *           BCSIZ       BLANK COMMON SIZE ON COMPLETION OF REQUEST.
124  *
125                  ENTRY   DMCMSZ
126  DMCMSZ      BSS     1               ENTRY/EXIT POINT
127                  SB7     1               (B7) = 1
128                  SA2     A1+B7           (X2) = ADDRESS(CMSIZ)           (FTN)
129                  SA1     X1              (X1) = REQCM                    (FTN)
130                  MX0     -18D                                            (FTN)
131                  SA3     A2+B7           (X3) = ADDRESS(BCSIZ)           (FTN)
132                  BX6     -X0*X1          LIMIT REQCM TO 2**18-1
133                  LX7     X3              (X7) = ADDRESS(BCSIZ)
134                  BX1     X6              KEEP REQCM IN (X1)
135                  SA6     REQCM           SAVE REQCM ON COMMON BLOCK
136                  LX6     30D
137                  SA6     MEMREQ          SET UP REQUEST WORD
138                  SB6     B7+B7           (B6) = 2
139                  BX6     X2              (X6) = ADDRESS(CMSIZ)
140                  SA7     A6+B6           SAVE ADDRESS(BCSIZ)
141                  SA6     A6+B7           SAVE ADDRESS(CMSIZ)
142                  ZR      X1,DMCMSZ1      SKIP PRINT IF REQCM=0
143                  SA5     RFLMESS+1
144                  RJ      =XNCOCTL$       ENCODE REQCM INTO (X6)
145                  SA4     RFLMESS
146                  SA6     ASTMSG+2        SET ASTMSG(3)
147                  LX7     X5
148                  BX6     X4
149                  SA7     A6-B7           SET ASTMSG(2)
150                  SA6     A7-B7           SET ASTMSG(1)
151                  RJ      =X1OMESSG       PRINT  REQUESTED CML  MESSAGE
152  DMCMSZ1     BSS     0
153                  SB1     1
154                  MEMORY  CM,MEMREQ,R,,1  MEMORY MACRO
155                  SA1     MEMREQ          (X1) = REQUEST/REPLY WORD
156                  SB4     BCFWA           (B4) = FWA OF BLANK COMMON
157                  SA2     A1+B1           (X2) = ADDRESS(CMSIZ)
158                  MX0     -18D
159                  AX1     30D             RIGHTADJUST CURRENT FL
160                  SA3     A2+B1           (X3) = ADDRESS(BCSIZ)
161                  SB4     B1-B4
162                  SB6     B1+B1           (B6) = 2
163                  BX6     -X0*X1          (X6) = CMSIZ = CURRENT CM FL
164                  SX7     X6+B4           (X7) = BCSIZ = CMSIZ-BC(0)
165                  SA4     NFLMESS
166                  SA6     CMSIZ           STORE CMSIZ IN /CDMPAD/
167                  SA5     A4+B1
168                  SB4     X7              SAVE BCSIZ IN (B4) FOR PRINT
169                  SA7     A6+B1           STORE BCSIZ IN /CDMPAD/
170                  SA6     X2              STORE CMSIZ IN 2ND ARG OF DMCMSZ
171                  SA7     X3              STORE BCSIZ IN 3RD ARG OF DMCMSZ
172                  BX6     X4
173                  SA6     ASTMSG+1        PLACE TEXT IN ASTMSG(2)
```

```
                NOZL3D -        IOMCIO
174             LX7     X5
175             SA7     A6+B6           PLACE TEXT IN ASTMSG(4)
176             RJ      =XNCOCTL$       OCTAL ENCODE CMSIZ IN (X6)
177             SA6     A7-B1           PLACE ENCODED CMFL IN ASTMSG(3)
178             SX1     B4              (X1) = BCSIZ
179             RJ      =XNCOCTL$       OCTAL ENCODE BCSIZ IN (X6)
180             SA6     A7+B1           PLACE ENCODED BCSIZ IN ASTMSG(5)
181             RJ      =XIOMESSG       PRINT INFORMATIVE MESSAGE
182             EQ      DMCMSZ          RETURN TO CALLING PROGRAM
183 MEMREQ      EQU     PAD+170B
184 RFLMESS     DIS     2,0+++      REQ CMSIZ&
185 NFLMESS     DIS     2,JOB CMSIZ&, BC SIZE&
186 DMCMSZ$     SPACE   2
187 ***         DMCMSZ$
188 *
189 *           COMPASS-CALLABLE, REGISTER-RESTORING, GROIN-KICKING
190 *           VERSION OF DMCMSZ.
191 *
192 *           COMPASS REFERENCE -
193 *
194 *           (X7) =    REQCM  (SEE DMCMSZ)
195 *           RJ        GETCML$
196 *
197 *           REGISTER UTILIZATION -
198 *           ENTRY REGISTER SET ASSUMED - (B1)=(B7)=1, (B6)=2
199 *           X1,X6,A1,A2,A3,A4,A5,A6,A7    DESTROYED
200 *           X0,X2,X3,X4,X5,B2,B3,B4,B5    PRESERVED
201 *           (B1),(B6),(B7) RESTORED TO 1,2,1, RESPECTIVELY.
202 *           (X1) = CMSIZ = CURRENT CM FL ON RETURN FROM DMCMSZ$.
203 *
204             ENTRY   DMCMSZ$
205 DMCMSZ$     BSSZ    1
206             SA7     REQCM           STORE (X7) IN REQCM WORD
207             SB7     1
208             LX6     X5
209             BX7     X4
210             SA6     SAVE+1          (X5) TO SAVE+1
211             SB6     B7+B7
212             SA7     A6+B7           (X4) TO SAVE+2
213             BX6     X3
214             LX7     X2
215             SA6     A6+B6           (X3) TO SAVE+3
216             BX6     X0
217             SA7     A7+B6           (X2) TO SAVE+4
218             SA6     A6+B6           (X0) TO SAVE+5
219             SX6     B5
220             SX7     B4
221             SA6     A6+B7           (B5) TO SAVE+6
222             SX6     B3
223             SA7     A6+B7           (B4) TO SAVE+7
224             SX7     B2
225             SA6     A6+B6           (B3) TO SAVE+8
226             SA7     A7+B6           (B2) TO SAVE+9
227             SA1     REQCMADS        (A1) POINTS TO ARG ADS LIST     (FTN)
228             RJ      DMCMSZ          EXECUTE DMCMSZ
229             SB7     1               RESTORE (B7) = 1
230             SA1     SAVE+9
231             SB6     B7+B7           RESTORE (B6) = 2
232             SA2     A1-B7
233             SA3     A1-B6
234             SA4     A2-B6
235             SB2     X1              RESTORE (B2)
236             SA1     A4-B7
237             SB3     X2              RESTORE (B3)
238             SA2     A1-B7           RESTORE (X2)
239             SB4     X3              RESTORE (B4)
240             SA3     A2-B7           RESTORE (X3)
241             SB5     X4              RESTORE (B5)
242             SA4     A3-B7           RESTORE (X4)
243             BX0     X1              RESTORE (X0)
244             SA1     CMSIZ           (X1) = CMSIZ  ON RETURN
245             SA5     A4-B7           RESTORE (X5)
246             SB1     B7              RESTORE (B1) = 1
247             EQ      DMCMSZ$         RETURN
248 SAVE        EQU     PADDING+100B
249 REQCMADS    VFD     42/0,18/REQCM   ADDRESS(REQCM)
250 CMSIZADS    VFD     42/0,18/CMSIZ   ADDRESS(CMSIZ)
251 BCSIZADS    VFD     42/0,18/BCSIZ   ADDRESS(BCSIZ)
252 DMCONV      SPACE   2
253 ***         DMCONV
254 *
255             ENTRY   DMCONV
256 DMCONV      BSS     1
257             SX6     1
258             SA6     DMERCM
259             EQ      DMCONV
260 *
```

```
261  DMDATE   SPACE   2
262  ***      DMDATE  (DATIM)
263  *
264  *        ENTRY POINT TO RETRIEVE CURRENT DATE AND TIME
265  *
266  *        CALL   DMDATE  (DATIM)
267  *
268  *        DATIM     A TWO-WORD ARRAY. CURRENT DATE WILL BE
269  *                  RETURNED IN DATIM(1) IN DISPLAY CODE FORMAT
270  *                  MMDDYY LEFTJUSTIFIED WITH BLANK FILL.
271  *                  THE CURRENT TIME WILL BE STORED IN DATIM(2),
272  *                  IN FORMAT HHMMSS ALSO LEFTJUSTIFIED BLANKFILLED.
273  *
274           ENTRY     DMDATE
275  DMDATE   BSSZ      1              ENTRY/EXIT POINT
276           BX5       X1             (X5) = ADDRESS(DATIM)          (FTN)
277           SB1       1              (B1) = 1
278           DATE      TIMLOC         DATE MACRO
279           CLOCK     TIMLOC+1       CLOCK MACRO
280           SA1       TIMLOC
281           SA4       =4R
282           MX0       12
283           SB2       6
284           LX1       6
285           LX2       B2,X1
286           BX1       X0*X1
287           LX3       B2,X2
288           LX0       48
289           BX2       X0*X2
290           LX0       48
291           BX3       X0*X3
292           BX6       X1+X2
293           SA1       A1+B1
294           BX6       X6+X3
295           BX6       X6+X4
296           MX0       12
297           SA6       X5             STORE DATIM(1)
298           LX1       6
299           LX2       B2,X1
300           LX3       B2,X2
301           BX1       X0*X1
302           LX0       48
303           BX2       X0*X2
304           LX0       48
305           BX3       X0*X3
306           BX7       X1+X2
307           BX7       X7+X3
308           BX7       X7+X4
309           SA7       X5+B1          STORE DATIM(2)
310           EQ        DMDATE         RETURN TO CALLING PROGRAM
311  DMFATE   SPACE     2
312  ***      DMFATE
313  *
314           ENTRY     DMFATE
315  DMFATE   BSS       1
316           SA2       DMSERRJ
317           SA1       DMSERRL                                       (FTN)
318           MX0       -18
319           BX2       -X0*X2
320  DMSERRJ  ZR        X2,DMABRT      DIRECT ABORT IF NO USER-SPEC ROUTINE
321           RJ        0              TRANSFER TO DMTERM-SPECIFIED ENTRY
322  DMSERRL  VFD       42/0,18/=3HDMS
323           VFD       42/0,18/DMERCD
324  DMHAST   SPACE     2
325  ***      DMHAST  (IERH, UPGERR, 0)
326  *
327           ENTRY     DMHAST
328  DMHAST   BSS       1
329           SA2       A1+1                                          (FTN)
330           SA1       X1             (X1) = IERH                    (FTN)
331           MX0       -18
332           SA5       IOMERRJ
333           BX7       X1
334           SA3       X2             (X3) = VALUE(UPGERR)
335           BX6       X0*X5          MASK OUT RJ ADDRESS FIELD
336           SA7       IOMERH         SET IOM ERROR HANDLING FLAG
337           SA6       A5
338           ZR        X3,DMHAST      EXIT IF ZERO SECOND ARGUMENT
339           BX2       -X0*X2
340           BX6       X6+X2
341           SA6       A6             STORE TRANSFER TO UPGERR
342           EQ        DMHAST
343  *
344  DMRUNT   SPACE     2
345  ***      DMRUNT  (CPTIME, IOTIME, CPTLIM)
346  *
347  *        ENTRY POINT TO OBTAIN PROGRAM TIMING INFORMATION
```

```
                NOZL3D -        IOMCIO
348   *
349   *         CALL    DMRUNT  (CPTIME, IOTIME, TIMLIM)
350   *
351   *         CPTIME    ELAPSED CP TIME IN F.P. SECONDS
352   *
353   *         IOTIME    ELAPSED I/O TIME IN F.P. SECONDS
354   *
355   *         TIMLIM    JOB CP TIME LIMIT IN F.P. SECONDS
356   *
357             ENTRY     DMRUNT
358   DMRUNT    BSSZ      1
359             SB7       1
360             SA2       A1+B7                                          (FTN)
361             SB1       X1                                             (FTN)
362             SA3       A2+B7                                          (FTN)
363             SB2       X2                                             (FTN)
364             SB3       X3                                             (FTN)
365             MX6       0
366             SB1       B7
367             SA6       TIMLOC+1
368             TIME      TIMLOC          GET TIME LIMIT, AND CP TIME
369             IFEQ      OS,SCOPE
370             IOTIME    TIMLOC+1        GET IO TIME                    (SCOPE)
371             ENDIF
372             SA1       TIMLOC          (X1) = 24/CPTLIM,36/CPTIME(SEC,MSEC)
373             MX0       24D
374             SA2       A1+B7           (X2) = 24/IOTLIM,36/IOTIME(SEC,MSEC)
375             BX6       X0*X1           (X6) = ISOLATED TIMLIM FIELD
376             BX1       -X0*X1          CLEAR CPTLIM FIELD
377             LX6       24D
378             BX2       -X0*X2          CLEAR IOTLIM FIELD
379             MX0       -12D
380             PX6       X6
381             NX6       X6
382             BX3       -X0*X1          (X3) = CPTIME MSEC (INTEGER)
383             BX4       -X0*X2          (X4) = IOTIME MSEC (INTEGER)
384             SA6       B3              STORE CP TIME LIMIT
385             SX5       1000D
386             AX1       12D             RIGHTJUSTIFY CPTIME SECS
387             AX2       12D             RIGHTJUSTIFY IOTIME SECS
388             DX1       X1*X5           (X1) = CPTIME SECS TO MILLISEC
389             DX2       X2*X5           (X1) = IOTIME SECS TO MILLISEC
390             SA5       =0.001          (X5) = MSEC TO SEC CONV FACTOR
391             IX1       X1+X3
392             IX2       X2+X4
393             PX1       X1
394             PX2       X2
395             NX1       X1
396             NX2       X2
397             RX6       X1*X5
398             RX7       X2*X5
399             SA6       B1              STORE ELAPSED CP TIME (F.P. SECS)
400             SA7       B2              STORE ELAPSED IO TIME (F.P. SECS)
401             EQ        DMRUNT          RETURN TO CALLING PROGRAM
402   DMTERM    SPACE     2
403   *
404   ***       DMTERM  (UPGERR)
405   *
406             ENTRY     DMTERM
407   DMTERM    BSS       1
408             SA2       DMSERRJ
409             MX0       -18
410             BX2       X0*X2
411             BX6       X1+X2
412             SA6       A2
413             EQ        DMTERM
414   DMUSER    SPACE     2
415   ***       DMUSER (NAME)
416   *
417             ENTRY     DMUSER
418   DMUSER    BSS       1
419             SA1       X1                                             (FTN)
420             BX6       X1
421             SA6       TRSTAK
422             EQ        DMUSER
423   IOFATE    SPACE     2
424   ***       IOFATE
425   *
426             ENTRY     IOFATE
427   IOFATE    BSS       1
428             SA2       IOMERRJ
429             SA1       IOMERRL                                        (FTN)
430             MX0       -18
431             BX2       -X0*X2
432   IOMERRJ   ZR        X2,IOFATE       RETURN IF NO USER-SPECIFIED ROUTINE
433             RJ        0               ELSE JUMP TO IT
434             EQ        IOFATE
```

```
                NOZL3D -        IOMCIO
435  IOMERRL    VFD         42/0,18/=3HIOM
436             VFD         42/0,18/DMERCD
437  *
438             TITLE       PROCEDURES FOR PHYSICAL DATA TRANSMISSION
439  ************************************************************************
440  *          PROCEDURES INVOLVING ACTUAL DATA TRANSFER BETWEEN           *
441  *          CENTRAL MEMORY AND AUXILIARY STORAGE                        *
442  *                                                                      *
443  *          AUTHOR -  C. A. FELIPPA, SEPT. 1975                         *
444  *          UPDATE -  NOVEMBER 1977                                     *
445  *                                                                      *
446  ************************************************************************
447  *                                                                      *
448  *          ENTRY POINT SUMMARY -                                       *
449  *                                                                      *
450  *          IOMEOF     WRITES AN END-OF-FILE MARK                       *
451  *                                                                      *
452  *          IOMPRU     GET MASS STORAGE FILE SIZE (IN PRUS)             *
453  *                                                                      *
454  *          IOMRDR     TRANSFERS A DATA BLOCK (RECORD) FROM AN AUX      *
455  *                     STORAGE DEVICE CHARACTERIZED BY A DMGASP DEVICE  *
456  *                     TYPE INDEX, TO MAIN STORAGE.  (ALT ENTRY RDMS    *
457  *                     ASSUMES SECTOR-ADDRESSABLE MASS STORAGE).        *
458  *                                                                      *
459  *          IOMWTR     TRANSFERS A DATA BLOCK (RECORD) FROM MAIN        *
460  *                     STORAGE TO AN AUX STORAGE DEVICE CHARACTERIZED   *
461  *                     A DMGASP DEVICE TYPE INDEX.  (ALT ENTRY WTMS     *
462  *                     ASSUMES SECTOR-ADDRESSABLE MASS STORAGE.)        *
463  *                                                                      *
464  *          IOMXEI     EXTENDS EOI BY WRITING DUMMY PRUS                *
465  *                                                                      *
466  ************************************************************************
467  IOMEOF     SPACE     2
468  ***        IOMEOF    (LFN)
469  *
470  *          WRITE AN END-OF-FILE MARK AT CURRENT DEVICE POSITION
471  *
472  *          FORTRAN REFERENCE -
473  *
474  *          CALL    IOMEOF (LFN)
475  *
476  *          WHERE
477  *
478  *          LFN       LOGICAL FILENAME
479  *
480              ENTRY     IOMEOF
481  IOMEOF     BSSZ      1
482              SX2       0104B           R-BIT=0,EP-BIT=1,XP-BIT=0,FETL=4
483              MX4       0
484              SX3       X2              DUMMY BUFFER ADDRESS
485              MX5       0
486              SX6       B0
487              RJ        =XFETSET$       ESTABLISH FET
488              WRITEF    FET,R           WRITE W/EOF MACRO
489              RJ        =XFETRET$       GET RET/AT CODES
490              EQ        IOMEOF          RETURN TO CALLING PROGRAM
491  IOMPRU     SPACE     2
492  ***        IOMPRU    (LFN)
493  *
494  *          OBTAIN LENGTH OF MASS STORAGE FILE IN PRUS
495  *
496  *          FORTRAN REFERENCE -
497  *
498  *          NPRU =    IOMPRU (LFN)
499  *
500  *          WHERE
501  *
502  *          LFN       LOGICAL FILENAME
503  *
504  *          IOMPRU    CURRENT FILE SIZE IN PRUS
505  *
506  *          REMARK -  THE NOS PRU COUNT (AS RETURNED BY THE LENGTH CC)
507  *          IS ALWAYS ONE MORE THAN THE SCOPE COUNT (AS RETURNED BY
508  *          THE STATUS MACRO). NO REASONS FOR THIS DISCREPANCY ARE
509  *          KNOWN (WHEN DOES A CDC O/S EVER MAKES SENSE, ANYWAY).
510  *          THIS FUNCTION CORRECTS THE NOS COUNT BY SUBSTRACTING 1.
511  *
512              ENTRY     IOMPRU
513  IOMPRU     BSS       1               ENTRY/EXIT
514              SB7       1               (B7) = 1
515              IFEQ      OS,SCOPE
516              MX6       1                                           (SCOPE)
517              SA1       X1              (X1) = LFN                  (SCOPE)
518              LX6       38D             (X6) = LIST HEADER = 24/2,36/0(SCOPE)
519              MX0       42D                                         (SCOPE)
520              SA6       FET             PUT LIST HEADER IN FET(1)   (SCOPE)
521              BX7       X0*X1                                       (SCOPE)
```

```
                NOZL3D -        IOMCIO
522             MX6     0                               (SCOPE)
523             SA7     A6+B7           STORE LFN IN FET(2)             (SCOPE)
524             SA6     A7+B7           CLEAR FET(3)                    (SCOPE)
525             STATUS  FET,3,R         ISSUE STATUS REQUEST            (SCOPE)
526             SA1     FET+2           (X1) = WORD WITH PRU COUNT      (SCOPE)
527             MX0     -24D                                            (SCOPE)
528             BX6     -X0*X1          MASK OUT PRU COUNT FIELD        (SCOPE)
529             ELSE
530             MX4     0                                               (NOS)
531             SX2     1002B                                           (NOS)
532             SX3     PAD                                             (NOS)
533             SX5     B0                                              (NOS)
534             MX6     0                                               (NOS)
535             RJ      =XFETSET$       ESTABLISH A FET                 (NOS)
536             SKIPEI  FET,R           POSITION FILE TO EOI            (NOS)
537             STATUS  FET,P           GET FNT/FST ENTRIES             (NOS)
538             SA1     FET+6           (X1) = FET(7) = FST ENTRY       (NOS)
539             MX0     -12D                                            (NOS)
540             AX1     12D             RIGHTJUSTIFY SECTOR COUNT FLD   (NOS)
541             BX6     -X0*X1          (X6) = CURRENT SECTOR NO.       (NOS)
542             AX1     12D             RIGHJUSTIFY CURRENT TRACK FLD   (NOS)
543             BX2     -X0*X1          (X2) = CURRENT TRACK NO.        (NOS)
544             AX1     12D             RIGHTJUSTIFY FIRST-TRACK FIELD  (NOS)
545             SX3     24D             (X3) = SECTORS PER TRACK        (NOS)
546             BX1     -X0*X1          (X1) = FIRST TRACK VALUE        (NOS)
547             IX2     X2-X1           (X2) = TRACK COUNT              (NOS)
548             SX4     B1              (X4) = 1                        (NOS)
549             DX2     X2*X3           CONVERT TRACK DIFF TO SECTORS   (NOS)
550             IX6     X2+X6           (X6) = SECTORS (PRU) COUNT      (NOS)
551             IX6     X6-X4           MAKE COUNT SCOPE COMPATIBLE     (NOS)
552             PL      X6,IOMPRU                                       (NOS)
553             MX6     0               IF COUNT NEGATIVE, SET (X6) = 0 (NOS)
554             ENDIF
555             EQ      IOMPRU          RETURN
556     *
557 IOMRDR    SPACE   2
558     ***     IOMRDR  (LFN, A, N, LOCR, TYPEX)
559     ***     RD MS   (LFN, A, N, LOCR)
560     *
561     *       ENTRY TO READ A RECORD FROM AUXILIARY STORAGE
562     *
563     *       FORTRAN REFERENCE -
564     *
565     *       CALL    IOMRDR  (LFN, A, N, LOCR, TYPEX)
566     *
567     *
568     *       WHERE THE FUNCTION OF THE ARGUMENTS IS IDENTICAL TO
569     *       THOSE OF IOMWTR (SEE BELOW)
570     *
571             ENTRY   IOMRDR
572     *       ENTRY   IOMRDR,RDMS
573 RDMS        BSS     1               STAGS-COMPATIBLE ENTRY POINY
574             SA5     RDMS            FETCH RETURN INSTRUCTION
575             SB7     1
576             BX7     X5
577             SA3     A1+B7           (X3) = ADDRESS(A)               (FTN)
578             SA4     A3+B7           (X4) = ADDRESS(N)               (FTN)
579             SA2     A4+B7           (X2) = ADDRESS(LOCR)            (FTN)
580             SA4     X4              (X4) = N                        (FTN)
581             SB4     X2              (B4) = ADDRESS(LOCR)            (FTN)
582             SA7     IOMRDR          STORE RETURN INSTR
583             NG      X4,IOMRDR       EXIT IF N LT 0
584             EQ      RDSAMS          TO SECTOR-ADDRESSABLE MS SECTION
585     *
586 IOMRDR    BSSZ    1               MAIN ENTRY POINT TO READ A RECORD
587             SB7     1               (B7) = 1
588             SB6     B7+B7           (B6) = 2
589             SA4     A1+B6           (X4) = ADDRESS(N)               (FTN)
590             SA3     A1+B7           (X3) = ADDRESS(A)               (FTN)
591             SA5     A4+B6           (X5) = ADDRESS(TYPEX)           (FTN)
592             SA2     A4+B7           (X2) = ADDRESS(LOCR)            (FTN)
593             SA4     X4              (X4) = N                        (FTN)
594             SA5     X5              (X5) = TYPEX                    (FTN)
595             SB4     X2              (B4) = ADDRESS(LOCR)            (FTN)
596             SB5     X5              (B5) = TYPEX
597             NG      X4,IOMRDR       EXIT IF N LT 0
598             GT      B5,B6,RDECS     TO ECS-READ SECTION IF TYPEX = 3
599             EQ      B5,B6,RDWAMS    TO WAMS SECTION IF TYPEX = 2
600             LT      B5,B0,RDTAPE    TO TAPE-READ SECTION IF TYPEX LT 0
601     *
602     *       READ RECORD FROM SECTOR-ADDRESSABLE MASS STORAGE
603     *
604 RDSAMS     BSS     0
605             SX5     X4+77B          (X5) = N + (64-1), (64=PRU SIZE)
606             SX2     1'04B           R-BIT=1,EP-BIT=1,XP-BIT=0,FETL=4
607             AX5     6               (X5) = (N+63)/64
608             SX6     B7              LIMIT = ADS(BUFFER)+NWXF+1
```

```
609             LX5     6               (X5) = NWXF = 64*((N+63)/64)
610             IX0     X5-X4           (X0) = NWXF-N = NWPAD
611             BX4     X5              (X4) = NWXF FOR FET ASSEMBLY
612             MX5     0               (X5) = 0  TO MARK READ CONDITION
613             IX7     X3+X4           (X7) = ADDRESS(A)+NWXF
614             SB2     X0              (B2) = NWPAD
615             SB5     X7              (B5) = ADDRESS(A(NWXF+1))
616             RJ      =XFETSET$       ESTABLISH FET
617             SA4     B4              (X4) = LOCR = PRU ORDINAL
618             SA1     CMSIZ           (X1) = CURRENT CM FL
619             BX6     X4              (X6) = LOCR
620             SA6     FET+6           PRU ORDINAL TO FET(7)
621             NZ      X1,RDSAMS1      SKIP IF CMSIZ CONTAINS NZ VALUE
622             MX7     0               ELSE CLEAR (X7) TO FLAG CMSIZ REQUEST
623             RJ      =XDMCMSZ$       AND OBTAIN CURRENT JOB SIZE
624 RDSAMS1     BSS     0
625             EQ      B2,RDSAMS4      OMIT PADDING PROCESSING IF NWPAD=0
626             SB3     X1              (B3) = CMSIZ
627             SX7     B5              (X7) = ADDRESS(A(NWXF+1))
628             GE      B3,B5,RDSAMS2   OMIT FL EXPANSION IF FL GE IN
629             RJ      =XDMCMSZ$       ELSE EXPAND CM TO (X7) WORDS
630 RDSAMS2     BSS     0
631             SA7     PADDING-1       (A7) POINTS TO PADDING(0)
632             SA2     B5              (A2) POINTS TO A(NWXF+1)
633             SB3     B0              INITIALIZE WORD XFER COUNTER
634 RDSAMS3     BSS     0
635              SA2     A2-B7          (X2) = A(NWXF+1-J)
636              SB3     B3+B7          INCREMENT COUNTER
637              BX7     X2
638              SA7     A7+B7          STORE IN PADDING(J)
639              LT      B3,B2,RDSAMS3  CYCLE
640             SA5     A7              (A5) = EXIT (A7) FOR RESTORE LOOP
641             SX5     A2              (X5) = EXIT (A2) FOR RESTORE LOOP
642 RDSAMS4     BSS     0
643             IFEQ    OS,NOS
644             SX0     B2              SAVE (B2) = NWPAD IN (X0)       (NOS)
645             ENDIF
646             READNS  FET,R           READ IGNORING EOR
647             IFEQ    OS,NOS
648             SB2     X0              RESTORE (B2) = NWPAD            (NOS)
649             ENDIF
650             RJ      =XFETRET$       GET RETURN DATA FROM FET
651             EQ      B2,IOMRDR       SKIP PAD-RESTORE IF NWPAD = 0
652             SA3     A5              (X3) = LAST WORD SAVED IN PADDING
653             SB2     B2-B7
654             BX6     X3
655             SA6     X5              RESTORE A(N+1)
656             LE      B2,IOMRDR       EXIT IF NWPAD = 1
657 RDSAMS6     BSS     0
658              SA3     A3-B7          (X3) = NEXT SAVED WORD
659              SB2     B2-B7          DECREMENT COUNTER
660              BX6     X3
661              SA6     A6+B7          RESTORE A(N+J)
662              GT      B2,RDSAMS6     CYCLE UNTIL (B2) = 0
663             EQ      IOMRDR          RETURN TO CALLING PROGRAM
664 *
665 *           READ RECORD FROM (SIMULATED) WORD-ADDRESSABLE
666 *           MASS STORAGE DEVICE (NOT YET IMPLEMENTED)
667 *
668 RDWAMS      BSS     0
669             EQ      WRWAMS          ISSUE DF MESSAGE AND ABORT
670 *
671 *           READ RECORD FROM TAPE
672 *
673 RDTAPE      BSS     0
674             SX2     0114B           R-BIT=0,EP-BIT=1,XP-BIT=1,FETL=4
675             SX6     1000B           LIMIT = ADS(BUFFER)+N+1000B
676             MX5     0               MARK READ CONDITION
677             RJ      =XFETSET$       ESTABLISH FET
678             READ    FET,R           STANDARD READ W/RECALL
679             RJ      =XFETRET$       GET RETURN DATA FROM FET
680             EQ      IOMRDR          RETURN TO CALLING PROGRAM
681 *
682 *           READ FROM EXTENDED CORE STORAGE
683 *
684 RDECS       BSS     0
685             SA2     B4              (X2) = LOCR
686             SB1     A0
687             SA0     X3              (A0) = ADDRESS(A)
688             SB3     X4              (B3) = N
689             BX0     X2              (X0) = ECS SOURCE ADDRESS
690             SX6     B3              (X6) = N
691             RE      B3              XMIT BLOCK
692             SA6     NWRDXF          SET NWRDXF
693             SA0     B1              RESTORE (A0)
694             EQ      IOMRDR          RETURN TO CALLING PROGRAM
695 *
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                NOZL3D -        IOMCIO
696  IOMWTR     SPACE   2
697  ***        IOMWTR  (LFN, A, N, LOCR, TYPEX)
698  ***        WTMS    (LFN, A, N, LOCR)
699  *
700  *          ENTRY TO WRITE A RECORD ON AUXILIARY STORAGE
701  *
702  *          FORTRAN REFERENCE -
703  *
704  *          CALL   IOMWTR  (LFN, A, N, LOCR, TYPEX)
705  *          CALL   WTMS    (LFN, A, N, LOCR)
706  *
707  *          WHERE
708  *
709  *          LFN       LOGICAL FILENAME IF AUXILIARY STORAGE MEDIUM
710  *                    IS MASS STORAGE OR MAGNETIC TAPE.  IGNORED IF
711  *                    RECORD IS TO BE WRITTEN ON ECS (LCM).
712  *
713  *          A         FWA OF SOURCE ARRAY IN PRIMARY MEMORY
714  *
715  *          N         NUMBER OF WORDS TO TRANSMIT. N=0 IS ADMISSIBLE.
716  *
717  *          LOCR      RECORD ADDRESS ARGUMENT.  SIGNIFICANCE DEPENDS
718  *                    ON EQUIPMENT TYPE.
719  *
720  *                    SECTOR-ADDRESSABLE MASS STORAGE (TYPEX=0,1)
721  *                      LOCR = 0   WRITE NEW RECORD AT EOI.  UPON A
722  *                      SUCCESSFUL WRITE, THE SYSTEM RETURNS THE  REL
723  *                      SECTOR ADDRESS (RSA) OF THE RECORD IN LOCR.
724  *                      LOCR GT 0.  SPECIFIES RECORD REWRITE AT
725  *                      RELATIVE SECTOR ADDRESS (RSA) IN LOCR.
726  *
727  *                    WORD-ADDRESSABLE MASS STORAGE (TYPEX=2)  THIS
728  *                    MODE IS NOT PRESENTLY IMPLEMENTED.
729  *
730  *                    MAGNETIC TAPE (TYPEX LT 0).  LOCR IS IGNORED
731  *                    AND RECORD XMISSION PROCEEDS AT CURRENT LOCATION.
732  *
733  *                    ECS/LCM (TYPEX=3). LOCR = FWA OF DESTINATION AREA.
734  *
735  *          TYPEX     DMGASP DEVICE TYPE INDEX (SEE DMGASP MANUAL)
736  *
737  *          NOTES -
738  *          1.  ENTRY WTMS (PROVIDED FOR STAGS COMPATIBILITY) ASSUMES
739  *              TYPEX = 0, I.E. SECTOR-ADDRESSABLE MASS STORAGE.
740  *
741  *          2.  NO END-OF-RECORD IS MARKED WHEN WRITING ON A RANDOM
742  *              ACCESS DEVICE (TYPEX GE 0).  TAPE RECORDS ARE TERMINATED
743  *              BY AN EOR MARK.
744  *              (THIS M.O. SIMPLIFIES UNIVAC I/O SIMULATION)
745  *
746              ENTRY   IOMWTR
747  *           ENTRY   IOMWTR,WTMS
748  WTMS        BSS     1               STAGS-COMPATIBLE ENTRY
749              SA5     WTMS            FETCH RETURN RJ INSTRUCTION
750              SB7     1               (B7) = 1
751              BX7     X5              (X7) = RET INSTR
752              SA3     A1+B7           (X3) = ADDRESS(A)                (FTN)
753              SA4     A3+B7           (X4) = ADDRESS(N)                (FTN)
754              SA2     A4+B7           (X2) = ADDRESS(LOCR)             (FTN)
755              SA4     X4              (X4) = N                         (FTN)
756              SB4     X2              (B4) = ADDRESS(LOCR)             (FTN)
757              SA7     IOMWTR          STORE RETURN INSTR
758              NG      X4,IOMWTR       EXIT IF N LT 0
759              EQ      WRSAMS          TO SECTOR-ADDRESSABLE MS SECTION
760  *
761  IOMWTR      BSSZ    1               MAIN ENTRY POINT TO WRITE A RECORD
762              SB7     1               (B7) = 1
763              SB6     B7+B7           (B6) = 2
764              SA4     A1+B6           (X4) = ADDRESS(N)                (FTN)
765              SA3     A1+B7           (X3) = ADDRESS(A)                (FTN)
766              SA5     A4+B6           (X5) = ADDRESS(TYPEX)            (FTN)
767              SA2     A4+B7           (X2) = ADDRESS(LOCR)             (FTN)
768              SA4     X4              (X4) = N                         (FTN)
769              SA5     X5              (X5) = TYPEX                     (FTN)
770              SB4     X2              (B4) = ADDRESS(LOCR)             (FTN)
771              SB5     X5              (B5) = TYPEX
772              NG      X4,IOMWTR       EXIT IF N LT 0
773              GT      B5,B6,WRECS     TO ECS-WRITE SECTION IF TYPEX = 3
774              EQ      B5,B6,WRWAMS    TO WAMS SECTION IF TYPEX = 2
775              LT      B5,B0,WRTAPE    TO TAPE-WRITE SECTION IF TYPEX LT 0
776  *
777  *           WRITE RECORD ON SECTOR-ADDRESSABLE MASS STORAGE
778  *
779  WRSAMS      BSS     0
780              SX5     X4+77B          (X5) = N + (PRUSIZ-1)
781              SX2     1104B           R-BIT=1,EP-BIT=1,XP-BIT=0,FETL=4
782              AX5     6               (X5) = (N+63)/64
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```
783             SX6     B7              MARK  LIMIT = ADS(BUFFER)+NWXF+1
784             LX5     6               (X5) = NWXF = 64*((N+63)/64)
785             IX0     X5-X4           (X0) = NWXF-N = NWPAD
786             BX4     X5              (X4) = NWXF FOR FET ASSEMBLY
787             IX7     X3+X5           (X7) = ADDRESS(A)+NWXF
788             SB2     X0              (B2) = NWPAD
789             SB5     X7              (B5) = ADDRESS(A(NWXF+1))
790             RJ      =XFETSET$       ESTABLISH FET
791             SA4     B4              (X4) = LOCR
792             SX0     B7              (X0) = 1
793             SX6     B4              (X6) = ADDRESS(LOCR)
794             MX7     0               (X7) = 0 TO FLAG DMCMSZ REQUEST
795             ZR      X4,WRSAMS1      TEST FOR LOCR = 0 (WRITE AT EOI)
796             IFEQ    OS,SCOPE
797             BX6     X4              (X6) = LOCR                     (SCOPE)
798             ELSE
799             LX0     29D             (X0) = 30/0,1/1,29/0              (NOS)
800             BX6     X4+X0           (X6) = LOCR + REWRITE BIT         (NOS)
801             ENDIF
802 WRSAMS1     BSS     0
803             SA1     CMSIZ           (X1) = CURRENT CM FL
804             SA6     FET+6           ADS(LOCR)/LOCR TO FET(7)
805             NZ      X1,WRSAMS2
806             RJ      =XDMCMSZ$       GET CURRENT CM SIZE
807 WRSAMS2     BSS     0
808             EQ      B2,WRSAMS5      OMIT PADDING PROCESSING IF NWPAD=0
809             SB3     X1              (B3) = CMSIZ
810             SX7     B5              (X7) = ADDRESS(A(NWXF+1))
811             GE      B3,B5,WRSAMS3   OMIT FL EXPANSION IF FL GE IN
812             RJ      =XDMCMSZ$       ELSE EXPAND CM FL TO (X7) WORDS
813 WRSAMS3     BSS     0
814 WRSAMS5     BSS     0
815             NZ      X4,WRSAMS6      BRANCH ON LOCR = ZR/NZ
816             WRITE   FET,R           WRITE MACRO
817             EQ      WRSAMS7
818 WRSAMS6     BSS     0
819             REWRITE FET,R           REWRITE MACRO
820 WRSAMS7     BSS     0
821             RJ      =XFETRET$       OBTAIN FET STATUS DATA
822             SA2     EOICOD          (X2) = EOI CODE
823             SA3     OUTMIN          (X3) = OUT-IN
824             MX6     42D             (X6) = FILENAME MASK
825             SB5     X2              (B5) = EOI CODE
826             ZR      X3,WRSAMS8      IF IN=OUT, WRITING IS COMPLETE
827             SA1     FET             (X1) = FET HEADER WORD
828             NE      B5,B7,WRSAMS8   TEST FOR TRUNCATION ON HITTING EOI
829             SX2     B6+B7           (X2) = 3
830             BX6     X6*X1           MASK OUT LFN IN (X6)
831             BX6     X6+X2           SET INTERLOCK/BINARY-MODE BITS
832             MX7     0
833             SA6     A1              RESTORE FET(1) TO VIRGIN CONDITION
834             SA7     NWRDXF          RESET NWRDXF TO ZERO
835             WRITE   FET,R           ISSUE FINAL WRITE TO MOVE EOI
836             RJ      =XFETRET$       GET RETURN PARAMETERS FROM FET
837 WRSAMS8     BSS     0
838             EQ      IOMWTR          RETURN TO CALLING PROGRAM
839 *
840 *       WRITE ON WORD-ADDRESSABLE MASS STORAGE (NOT IMPLEMENTED)
841 *
842 WRWAMS      BSS     0
843             MESSAGE WAMSG,,R
844             ABORT
845 WAMSG       DIS     4,WORD-ADDRESSABLE MODE NOT AVAILABLE
846             BSSZ    1
847 *
848 *       WRITE RECORD ON TAPE
849 *
850 WRTAPE      BSS     0
851             SX2     0114B           R-BIT=0,EP-BIT=1,XP-BIT=1,FETL=4
852             SX6     1000B           LIMIT = ADS(BUFFER)+N+1000B
853             SB3     X4              (B3) = N
854             BX5     X4              X5 = N (WRITE CONDITION)
855             RJ      =XFETSET$       ESTABLISH FET
856             IFEQ    OS,SCOPE
857             WRITER  FET,,R          WRITE W/EOR AND RECALL          (SCOPE)
858             ELSE
859             WRITER  FET,R           WRITE W/EOR AND RECALL            (NOS)
860             ENDIF
861             RJ      =XFETRET$       GET RETURN PARAMETERS FROM FET
862             EQ      IOMWTR          RETURN TO CALLING PROGRAM
863 *
864 *       WRITE ON EXTENDED CORE (LARGE MEMMORY)
865 *
866 WRECS       BSS     0
867             SA2     B4              (X2) = LOCR
868             SB1     A0
869             SB3     X4              (B3) = N
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                NOZL3D -        IOMCIO
870             SA0     X3              (A0) = ADDRESS(A)
871             SX6     B3              (X6) = N
872             BX0     X2              (X0) = ECS DESTINATION ADDRESS
873             WE      B3              XMIT N-WORD BLOCK (B3) = N
874             SA6     NWRDXF          SET NWRDXF
875             SA0     B1              RESTORE (A0)
876             EQ      IOMWTR          RETURN
877   *
878   IOMXEI    SPACE   2
879   ***       IOMXEI  (LFN, NPRUS)
880   *
881   *         EXTEND EOI OF MASS STORAGE FILE BY WRITING A SPECIFIED
882   *         NUMBER OF DUMMY (ZERO FILLED) PHYSICAL RECORD UNITS (PRUS).
883   *         THIS IS NEEDED FOR UNIVAC SIMULATION ON THE CDC.
884   *
885   *         FORTRAN REFERENCE -
886   *
887   *         CALL    IOMXEI (LFN, NPRUS)
888   *
889   *         WHERE
890   *
891   *         LFN     LOGICAL FILE NAME
892   *
893   *         NPRUS   NO. OF PRUS TO BE WRITTEN (MAX 2**17)
894   *
895   *
896   *
897             ENTRY   IOMXEI
898   IOMXEI    BSS     1               ENTRY/EXIT
899             SB7     1               (B7) = 1
900             SA5     A1+B7           (X5) = ADDRESS(NPRUS)           (FTN)
901             SA5     X5              (X5) = NPRUS                    (FTN)
902             BX6     X1
903             SA6     LFNADS          SAVE ADDRESS(LFN)
904             BX7     X5
905             SA7     A6+B7           SAVE NPRUS
906             BX1     X5
907             RJ      =XNCOCTL$       ENCODE NPRUS IN (X6)
908             SA2     XEIMESG
909             SA6     ASTMSG+3
910             SA3     A2+B7
911             SA4     A3+B7
912             LX7     X3
913             BX6     X4
914             SA7     A6-B7
915             SA6     A6+B7
916             BX7     X2
917             SA7     A7-B7
918             RJ      =XIOMESSG       PRINT MESSAGE
919             SA1     LFNADS          RESTORE (X1) = LFN ADDRESS
920             SA5     PRUXEI          RESTORE (X5) = NPRUS
921             SX2     1104B
922             SX3     BUFFER          (X3) = ADDRESS(BUFFER)
923             SX4     BUFSIZ          (X4) = BUFFER SIZE (WORDS)
924             BX5     X4              (X5) = (X4) FOR WRITE MODE
925             MX6     0
926             SB4     X4              (B4) = BUFSIZ
927             RJ      =XFETSET$       ESTABLISH FET
928             MX6     0               CLEAR (X6)
929             SB2     B7              INITIALIZE COUNTER (B2)=1
930             SA6     BUFFER          INITIALIZE (A6)
931   XTEOI1    BSS     0
932             SB2     B2+B7           COUNT
933             SA6     A6+B7           CLEAR BUFFER WORD
934             LT      B2,B4,XTEOI1    CYCLE UNTIL BUFFER IS CLEARED
935   *
936   XTEOI2    BSS     0
937             SA5     PRUXEI          (X5) = REMAINING PRUS TO WRITE
938             SA1     FET             (X1) = FET HEADER
939             MX0     44D
940             SB3     BUFPRU
941             SB5     X5              (B5) = REMAINING PRUS
942             LX0     2               (X0) = MASK FOR LFN AND MODE/ITLOCK
943             SX6     B5-B3           DECREMENT REM.PRU COUNTER
944             BX7     X0*X1           (X7) = FET HEADER WORD
945             SA6     PRUXEI
946             SA7     A1              STORE FET HEADER
947             SX6     B3              ASSUME FULL BUFFER WRITE
948             SX7     BUFFER-1        (X7) = ADDRESS(BUFFER-1)
949             LT      B5,IOMXEI       EXIT IF (B5) LE 0
950             GE      B5,B3,XTEOI3    TEST FOR LAST PARTIAL WRITE
951             SX6     B5
952   XTEOI3    BSS     0
953             SA7     FET+6           ADDRESS(BUFFER-1) TO FET(7)
954             SX7     X7+B7           (X7) = ADDRESS(BUFFER)
955             LX6     6               CONVERT PRUS TO WORDS
956             SA6     NWXWRT          TO GET CORRECT NWRDXF
```

```
         SA7     FET+3           RESET (OUT) = ADDRESS(BUFFER)
         IX6     X6+X7           (X6) = ADDRESS(BUFFER)+NWXF
         SA6     A7-B7           RESET (IN)
         WRITE   FET,R           WRITE BUFFER
         RJ      =XFETRET$       GET FET RETURN DATA
         NZ      X1,IOMXEI       ABANDON PROCESS IF ERROR
         EQ      XTEO12          CYCLE
XEIMESG  DIS     3,EOI TO BE XTENDED BY   PRUS
         SPACE   3
         END
```

```
                NOZL3D -        IOMFAP
 1  *DECK         IOMFAP
 2  * =DECK       IOMFAP        IOMFAP      ASSEMBLY
 3                IDENT     IOMFAP
 4  FILACT        TITLE     FILE ACTIVITY AND POSITIONING OPERATIONS
 5  *CALL           IOMACTL
 6                IFEQ      OS,NOS          *
 7  ************************************                                  (NOS)+
 8  *    EXTERNAL TEXT COMMON DECKS     *                                (NOS)
 9  ************************************                                  (NOS)
10  *             LIST      X             *                               (NOS)
11                XTEXT     COMCSYS       *  SYSTEM REQUEST ROUTINES      (NOS)
12                XTEXT     COMCCIO       *  I/O REQUEST PROCESSOR        (NOS)
13                ENDIF                   *
14  ************************************
15  COMMON        SPACE     2
16  ***           COMMON BLOCK DECLARATION
17  *
18  * =PROCEDURE CDMASTA
19  *CALL           CDMASTA
20                USE       0
21                SPACE     3
22  ***************************************************************************
23  *                                                                         *
24  *             FILE ACTIVITY FUNCTIONS PROVIDE CONTROL OVER DYNAMIC        *
25  *             ASSIGNMENT OF PERIPHERAL EQUIPMENT, OPENING, CLOSING        *
26  *             ERASING, AND POSITIONING OF LOGICAL/ILLOGICAL FILES         *
27  *                                                                         *
28  ***************************************************************************
29  *                                                                         *
30  *             PROGRAMMED BY C.A. FELIPPA, NOV 1975                        *
31  *                                                                         *
32  *             UPDATE - NOV 1977                                           *
33  *                                                                         *
34  *             A FUNCTION SUMMARY FOLLOWS.                                 *
35  *                                                                         *
36  *             BSKIPR    BACKWARD SKIP LOGICAL RECORDS                     *
37  *                                                                         *
38  *             BSKIPF    BACKWARD SKIP FILES                               *
39  *                                                                         *
40  *             FSKIPR    FORWARD SKIP  LOGICAL RECORDS                     *
41  *                                                                         *
42  *             FSKIPF    FORWARD SKIP  FILES                               *
43  *                                                                         *
44  *             IOMCLS    CLOSES A LOGICAL FILE WITH RETURN.                *
45  *                                                                         *
46  *             IOMEVT    DISCARDS CONTENTS OF FILE. LOGICAL FILENAME       *
47  *                       REMAINS ATTACHED TO JOB CONTROL POINT.            *
48  *                                                                         *
49  *             IOMOPN    OPENS A LOGICAL FILE.                             *
50  *                                                                         *
51  *             IOMPOD    POSITIONS DIRECT ACCESS DEVICE  ACCORDING TO      *
52  *                       DMGASP LOCATION PARAMETERS                        *
53  *                                                                         *
54  *             IOMPOT    POSITIONS MAGNETIC TAPE DEVICE ACCORDING TO       *
55  *                       DMGASP LOCATION PARAMETERS                        *
56  *                                                                         *
57  *             IOMREW    POSITION FILE TO BOI (REWIND)                     *
58  *                                                                         *
59  *             IOMRMT    REQUESTS MAGNETIC TAPE ASSIGNMENT                 *
60  *                       (PRESENTLY DEACTIVATED)                           *
61  *                                                                         *
62  ***************************************************************************
63  IOMCLS        SPACE     2
64  ***           IOMCLS  (LFN)
65  *
66  *             ENTRY POINT TO CLOSE A LOGICAL FILE. THIS OPERATION
67  *             TERMINATES FILE ACTIVITY.
68  *
69  *             FORTRAN REFERENCE -
70  *
71  *             CALL    IOMCLS  (LFN)
72  *
73  *             WHERE
74  *
75  *             LFN       LOGICAL FILENAME
76  *
77                ENTRY     IOMCLS
78  IOMCLS        BSS       1               ENTRY/EXIT POINT
79                SX2       01048B          R-BIT=0,EP-BIT=1,XP-BIT=0,FETL=4
80                MX4       0               N = 0
81                SX3       X1              DUMMY BUFFER ADDRESS
82                MX5       0
83                SX6       B0
84                RJ        =XFETSET$       ESTABLISH FET
85  +             SA2       =7HRETURN,
86                RJ        FAMESG          PRINT INFORMATIVE MESSAGE
```

```
                NOZL3D -        IOMFAP
 87             CLOSE     FET,RETURN,R    CLOSE WITH RETURN
 88             SA5       IOMCLS          FETCH RETURN INSTRUCTION
 89             EQ        FAEXIT          TO EXIT SECTION
 90  *
 91  IOMEVT     SPACE     2
 92  ***        IOMEVT  (LFN)
 93  *
 94  *          ENTRY POINT TO EVICT (ERASE IN UNIVAC PARLANCE) A FILE
 95  *
 96  *          FORTRAN REFERENCE -
 97  *
 98  *          CALL   IOMEVT  (LFN)
 99  *
100  *          WHERE
101  *
102  *          LFN       LOGICAL FILE NAME.  CONTENTS OF LFN ARE
103  *                    DISCARDED. FILE IS NOT RELEASED FROM JOB.
104  *
105             ENTRY     IOMEVT
106  IOMEVT     BSSZ      1               ENTRY/EXIT POINT
107             SX2       0104B           R-BIT=0,EP-BIT=1,XP-BIT=0,FETL=4
108             MX4       0               N = 0
109             SX3       X1              DUMMY BUFFER ADDRESS
110             MX5       0
111             SX6       B0
112             RJ        =XFETSET$       ESTABLISH FET
113  +          SA2       =7HEVICT,
114             RJ        FAMESG          PRINT INFORMATIVE MESSAGE
115             EVICT     FET,R           EVICT MACRO
116             SA5       IOMEVT          FETCH RETURN INSTRUCTION
117             EQ        FAEXIT          TO EXIT SECTION
118  *
119  IOMOPN     SPACE     2
120  ***        IOMOPN  (LFN)
121  *
122  *          ENTRY POINT TO OPEN A FILE. THIS FUNCTION IS PRIMARILY
123  *          DESIGNED FOR ACQUIRING DEVICE ATTRIBUTE INFORMATION
124  *
125  *          FORTRAN REFERENCE -
126  *
127  *          CALL      IOMOPN  (LFN)
128  *
129  *          WHERE
130  *
131  *          LFN       LOGICAL FILENAME  (1-7 CHARS, LJ ZEROFILLED)
132  *                    ON RETURN, FNT POINTER INSERTED IN BITS 0-11
133  *
134  *          VALUES RETURNED IN COMMON BLOCK /CDMAST/ INCLUDE
135  *          DEVTYP    CDC DEVICE CODE (12 BITS)
136  *          PRUSIZ    PRU SIZE FOR DEVICE TO WHICH LFN IS ASSIGNED
137  *          FNTPNT    FNT POINTER, INSERTED IN LOW 12 BITS OF LFN
138  *
139             ENTRY     IOMOPN
140  IOMOPN     BSSZ      1               ENTRY/EXIT POINT
141             MX4       0               N = 0
142             SX2       0104B           R-BIT=0,EP-BIT=1,XP-BIT=0,FETL=4
143             MX5       0
144             BX3       X1              DUMMY BUFFER ADDRESS
145             SX6       B0
146             RJ        =XFETSET$       ESTABLISH FET
147             BX7       X1
148             SA7       LFNADS          SAVE LFN ADDRESS
149  +          SA2       =5HOPEN,
150             RJ        FAMESG          PRINT INFORMATIVE MESSAGE
151             OPEN      FET,,R          ISSUE OPEN MACRO
152             SA1       LFNADS          (X1) = LFN ADDRESS
153             SA2       FET+1           (X2) = FET(2)
154             SB7       B1
155             MX0       -12D
156             SA3       X1              (X3) = LFN
157             SA4       FET+4           (X4) = FET(5)
158             LX2       12D             RIGHTJUSTIFY DEVICE-TYPE FIELD
159             LX4       12D             RIGHTJUSTIFY FNT POINTER
160             BX6       -X0*X2          EXTRACT DEVICE TYPE
161             BX7       -X0*X4          EXTRACT FNT POINTER
162             SA6       DEVTYP
163             MX0       42D
164             BX3       X0*X3           CLEAR BITS FOLLOWING LFN
165             LX4       30D             RIGHTJUSTIFY PRU SIZE FIELD
166             BX6       X3+X7           INSERT FNT POINTER
167             SA6       A3              STORE (LFN/FNTPNT)
168             MX0       -15D
169             BX6       -X0*X4
170             SA6       PRUSIZ
171             SA5       IOMOPN
172             EQ        FAEXIT          TO EXIT SECTION
173  IOMPOD     SPACE     2
```

```
174  ***       IOMPOD    (CDLOC, LCARG1, LCARG2, SECTOR)
175  *
176  *         ESTABLISH NEW POSITION OF DIRECT ACCESS DEVICE
177  *
178  *         FORTRAN REFERENCE -
179  *
180  *         CALL      IOMPOD   (CDLOC, LCARG1, LCARG2, SECTOR)
181  *
182  *         WHERE
183  *
184  *         CDLOC     ON ENTRY, CURRENT DEVICE LOCATION (SECTORS)
185  *                   ON EXIT,  UPDATED DEVICE LOCATION  (SECTORS)
186  *
187  *         LCARG1    FIRST LOCATION ARGUMENT IN DMPAST
188  *
189  *         LCARG2    SECOND LOCATION ARGUMENT IN DMPAST
190  *
191  *         SECTOR    DEVICE SECTOR SIZE IN WORDS
192  *
193               ENTRY     IOMPOD
194  POSDAD       BSS       0
195  IOMPOD       BSSZ      1              ENTRY/EXIT
196               SB7       1              (B7) = 1
197               SB6       B7+B7          (B6) = 2
198               SA2       A1+B7                                          (FTN)
199               SA3       A1+B6                                          (FTN)
200               SA4       A2+B6                                          (FTN)
201               SA1       X1             (X1) = CDLOC                    (FTN)
202               SA2       X2             (X2) = LCARG1                   (FTN)
203               SA3       X3             (X3) = LCARG2                   (FTN)
204               SA4       X4             (X4) = SECTOR                   (FTN)
205               BX7       X2             (X7) = LCARG1
206               SB3       X3             (B3) = LCARG2
207               SB4       X4             (B4) = SECTOR
208               BX6       X2
209               EQ        B3,PDAD4       IF LCARG2=0, CDLOC=LCARG1 AND EXIT
210               AX2       60D            (X2) = EXTENDED SIGN OF LCARG1
211               BX6       X7-X2          (X6) = IABS(LCARG1)
212               EQ        B4,B7,PDAD2    IF SECTOR=1, OMIT CONVERSION
213               SX6       X6+77B
214               AX6       6              (X6) = COVERING SECTOR COUNT (CSC)
215  PDAD2        PL        X7,PDAD3
216               BX6       -X6            RESTORE LCARG1 SIGN
217  PDAD3        SA6       A1             SET CDLOC = COV.SECTOR COUNT (SIGNED)
218               GT        B3,IOMPOD      EXIT IF ABSOLUTE POSITIONING
219               IX6       X6+X1          ELSE (X6) = CDLOC + CSC
220  PDAD4        SA6       A1             SET NEW LOCATION
221               EQ        IOMPOD         EXIT
222  *
223  IOMPOT       SPACE     2
224  ***          IOMPOT    (LFN, CDLOC, NEWLOC)
225  *
226  *         POSITION MAGNETIC TAPE DEVICE THROUGH THE
227  *         DMGASP LOCATION PARAMETER
228  *
229  *         FORTRAN REFERENCE -
230  *
231  *         CALL      IOMPOT  (LFN, CDLOC, NEWLOC)
232  *
233  *         WHERE
234  *
235  *         LFN       LOGICAL FILENAME OF TAPE DEVICE
236  *
237  *         CDLOC     ON ENTRY, CURRENT DEVICE LOCATION.
238  *                   ON EXIT, CDLOC=NEWLOC IF NO ABNORMAL
239  *                   CONDITION IS DETECTED, ELSE CDLOC EXITS
240  *                   AT LAST ERROR FREE POSITION
241  *
242  *         NEWLOC    DESIRED LOCATION
243  *
244  *
245               ENTRY     IOMPOT
246  POSTAP       BSS       0
247  IOMPOT       BSSZ      1              ENTRY POINT
248               SX2       0114B          R-BIT=0,E-BIT=1,XP-BIT=1,FETL=4
249               BX3       X1             DUMMY BUFFER ADDRESS
250               SX4       B0             N=0
251               MX5       0
252               SX6       X2             DUMMY BUFFER EXTENT
253               RJ        =XFETSET$      ESTABLISH FET
254               SA2       A1+B7          (X2) = ADDRESS(CDLOC)           (FTN)
255               SA3       A1+B6          (X3) = ADDRESS(NEWLOC)          (FTN)
256               SA2       X2             (X2) = CDLOC                    (FTN)
257               SA3       X3             (X3) = NEWLOC                   (FTN)
258               IX7       X3-X2          (X7) = NEWLOC-CDLOC
259               ZR        X7,IOMPOT      EXIT IF NEWLOC = CDLOC
260               MX5       18D
```

```
                NOZL3D -        IOMFAP
261             AX7     12D             (X7) = MOVFIL = FILES TO MOVE
262             LX5     36D             (X5) = MASK FOR FILE/REC COUNT
263             ZR      X7,TAPOS4
264   *
265   *         POSITIONING BY FILES
266   *
267             AX2     12D             (X2) = CDFIL
268             AX3     12D             (X3) = NEWFIL
269             PL      X7,TAPOS2
270             BX7     -X7
271             SB3      X3             (B3) = NEWFIL
272             SB2      X7             (B2) = MOVFIL
273             GT      B3,B2,TAPOS2    TO BACKSKIP FILE SECTION IF
274             REWIND  FET,R           REWIND TAPE
275             SA1     FET             FETCH FET HEADER
276             MX0     42D
277             MX6     0               (X6) = 0
278             BX1     X0*X1           CLEAR REQ/RTN FIELD
279             SX5     B6+B7           (X5) = 3
280             SA6     A2              SET CDLOC = 0
281             BX7     X1+X5           SET FILE MODE/INTERLOCK BITS
282             SA7     A1              RESTORE FET HEADER
283             EQ      B3,B0,TAPOS3    OMIT FORWARD SKIP IF NEWFIL=0
284             SX7     B3              SET MOVFIL = NEWFIL
285   *
286   TAPOS1    BSS     0
287             SA4     FSFMAC+1        FETCH OPERATION DESCRIPTOR
288             LX7     18D             ROTATE MOVFIL
289             BX4     X4*X5           CLEAR FILE COUNT FIELD (N)
290             BX6     X4+X7           INSERT MOVFIL
291             SA6     A4              STORE OP DESCRIPTOR
292   FSFMAC    SKIPF   FET,,17B,R      FORWARD SKIP FILES
293             EQ      TAPOS3
294   TAPOS2    SA4     BSFMAC+1        FETCH OP DESCRIPTOR
295             LX7     18D             ROTATE FILE COUNT
296             BX4     X4*X5           CLEAR FILE COUNT FIELD
297             BX6     X4+X7
298             SA6     A4
299   BSFMAC    SKIPB   FET,,17B,R      BACKSKIP FILES
300   TAPOS3    LX3     12D             CDLOC = 4096*(NEWFIL-1)
301             BX6     X3
302             SA6     A2              UPDATE CDLOC
303   *
304   *         POSITION TAPE BY RECORDS
305   *
306   TAPOS4    BSS     0
307             SA2     A2
308             SA3     A3
309             SA1     FET
310             MX0     42D
311             BX1     X0*X1
312             BX6     X1+X3
313             SA6     A1
314             MX0     -12D
315             IX7     X3-X2
316             BX7     -X0*X7
317             ZR      X7,TAPOS6
318             PL      X7,TAPOS5
319             SA4     BSRMAC+1
320             BX7     -X7
321             LX7     18D
322             BX4     X4*X5
323             BX6     X6+X7
324             SA6     A4
325   BSRMAC    SKIPB   FET,,0,R        BACKSKIP RECORDS
326             EQ      TAPOS6
327   TAPOS5    SA4     FSRMAC+1
328             LX7     18D
329             BX4     X4*X5
330             BX6     X4+X7
331             SA6     A4
332   FSRMAC    SKIPF   FET,,0,R        FORWARD SKIP RECORDS
333   *
334   TAPOS6    BX6     X3
335             SA6     A2              SET CDLOC = NEWLOC
336             EQ      IOMPOT          RETURN TO CALLING PROGRAM
337   *
338   IOMREW    SPACE   2
339   ***       IOMREW  (LFN)
340   *
341   *         ENTRY POINT TO REWIND A FILE
342   *
343   *         FORTRAN REFERENCE -
344   *
345   *         CALL    IOMREW  (LFN)
346   *
347   *         WHERE
```

```
348  *
349  *          LFN       LOGICAL FILENAME
350  *
351               ENTRY     IOMREW
352  IOMREW       BSSZ      1                 ENTRY/EXIT POINT
353               MX3       0
354               SX2       0104B
355               MX4       0
356               SX5       B0
357               MX6       0
358               RJ        =XFETSET$         ESTABLISH FET
359               REWIND    FET,R             REWIND MACRO
360               RJ        FETRET$           GET RET/AT CODES
361               EQ        IOMREW            RETURN TO CALLING PROGRAM
362  SKPSYST      IFEQ      OS,SCOPE
363  ***          BSKIPR/BSKIPF/FSKIPR/FSKIPF (LFN, N)
364  *
365  *          ENTRY POINTS TO SKIP RECORDS OR FILES
366  *
367  *          FORTRAN REFERENCES -
368  *
369  *          ----------------------
370  *          CALL   BSKIPR  (LFN, N)
371  *          CALL   BSKIPF  (LFN, N)
372  *          CALL   FSKIPR  (LFN, N)
373  *          CALL   FSKIPF  (LFN, N)
374  *          ----------------------
375  *
376  *          WHERE
377  *
378  *          LFN       LOGICAL FILE NAME
379  *
380  *          N         NO. OF RECORDS OR FILES TO BE SKIPPED
381  *                    (MAX. 77776B)
382  *
383  *
384               ENTRY     BSKIPR,BSKIPF,FSKIPR,FSKIPF
385  BSKIPF       BSSZ      1
386               SA4       BSKIPF            FETCH RETURN INSTRUCTION
387               SB4       17B               LEVEL=17B (FILE)
388               SB5       1                 B5=1 FOR BACKWARD SKIP
389               EQ        SKIP1
390  BSKIPR       BSSZ      1                 ENTRY POINT
391               SA4       BSKIPR            FETCH RETURN INSTRUCTION
392               SB4       B0                LEVEL=0  (RECORD)
393               SB5       1                 B5=1 FOR BACKWARD SKIP
394               EQ        SKIP1
395  FSKIPF       BSSZ      1                 ENTRY POINT
396               SA4       FSKIPF            FETCH RETURN INSTRUCTION
397               SB4       17B               LEVEL=17B (FILE)
398               SB5       B0                B5=0 FOR FORWARD SKIP
399               EQ        SKIP1
400  FSKIPR       BSSZ      1                 ENTRY POINT
401               SA4       FSKIPR            FETCH RETURN INSTRUCTION
402               SB4       B0                LEVEL=0  (RECORD)
403               SB5       B0                B5=0 FOR FORWARD SKIP
404  SKIP1        BSS       0
405               BX6       X4                (X6) = RETURN INST
406               SA6       SKPRET            STORE RETURN INSTRUCTION
407               MX3       0
408               SX2       0104B
409               MX4       0
410               SX5       B0
411               MX6       0
412               RJ        =XFETSET$         ESTABLISH FET
413               SA2       A1+B7             ADDRESS(N) TO X2                (FTN)
414               SA2       X2                (X2) = N                        (FTN)
415               SA3       SKPTAB+B5         FETCH CPC ARGUMENT WORD
416               MX0       42D
417               SX5       B4                (X5) = RECORD LEVEL
418               BX2       -X0*X2            LIMIT N TO 6 OCTAL DIGITS
419               LX5       14D               ROTATE LEVEL FOR INSERTION
420               LX2       18D               ROTATE N
421               BX6       X3+X5             INSERT LEVEL
422               BX6       X6+X2             INSERT N
423               SA6       SKPMAC+1          STORE AFTER CPC REFERENCE
424  SKPMAC       SA1       FET
425               RJ        =XCPC             ISSUE REQUEST
426               BSSZ      1
427               RJ        FETRET$           GET CODE/STATUS
428  SKPRET       BSSZ      1                 RETURN TO CALLING PROGRAM
429               USE       1
430  SKPTAB       BSS       0
431               VFD       18D/3,2/1,40D/240B    FSKIP REQUEST WORD
432               VFD       18D/3,2/1,40D/640B    BSKIP REQUEST WORD
433               USE       0
434  SKPSYST      ENDIF
```

```
                NOZL3D -        IOMFAP
435  FAMESG     SPACE   2
436  **         UTILITY BLOCK TO PRINT INFORMATIVE MESSAGE
437  *
438             EXT     IOMESSG,LFNBF$,NCOCTL$
439  FAMESG     BSS     1
440             SA3     =6H0+++
441             SA1     FET             (X1) = LFN
442             BX7     X2
443             SA7     ASTMSG+1        PUT OP ID IN ASTMSG(2)
444             BX6     X3
445             SA6     ASTMSG          INITIALIZE ASTMSG(1)
446             RJ      =XLFNBF$        BLANKFILL LFN IN (X6)
447             SA6     A7+B7           STORE LFN IN ASTMSG(3)
448             RJ      =XIOMESSG       PRINT MESSAGE
449             SB1     1               RESTORE (B1) = 1
450             EQ      FAMESG
451  *
452  **         UTILITY CODE BLOCK FOR TERMINATION ACTIVITIES
453  *
454  *          ENTRY -   (X5) = RETURN INSTRUCTION
455  *
456  FAEXIT     BSS     0
457             BX7     X5
458             SA7     FARETRN         STORE RETURN INST
459             RJ      =XFETRET$       GET RETURN PARAMETERS FROM FET
460             ZR      X1,FARETRN      EXIT IF STATUS = 0
461             RJ      =XNCOCTL$       ENCODE STATUS IN (X6)
462             SA5     =10HFAC STATUS
463             SA6     ASTMSG+2        PLACE STATUS IN ASTMSG(3)
464             BX7     X5
465             SA7     A6-B7           EXPLANATORY TEXT TO ASTMSG(2)
466             RJ      =XIOMESSG       PRINT STATUS MESSAGE
467  FARETRN    PS                      RETURN TO CALLING PROGRAM
468  *
469             END
```

```
            NOZL3D -        IOMFIP
1   *DECK       IOMFIP
2   * =DECK      IOMFIP      IOMFIP      ASSEMBLY
3             IDENT     IOMFIP
4             TITLE     FILE INFORMATION/IDENTIFICATION PROCEDURES
5   ASMCTL    SPACE     3
6   *CALL       IOMACTL
7             IFEQ      OS,NOS        *
8   ************************************                                (NOS)
9   *    EXTERNAL TEXT COMMON DECKS    *                                (NOS)
10  ************************************                                (NOS)
11            ENDIF                   *
12  ************************************
13  COMMON    SPACE     2
14  ***       COMMON BLOCK DECLARATION
15  *
16  * =PROCEDURE CDMASTA
17  *CALL        CDMASTA
18  *
19            USE       /CDMPAD/
20  CMSIZ     BSS       1
21  BCSIZ     BSS       1
22  REQFL     BSS       1
23  LWAREC    BSS       1
24  BUFFER    BSS       0
25  PAD       BSS       300B
26  *
27            USE       0
28            SPACE     3
29  ***************************************************************************
30  *                                                                         *
31  *         FILE INFORMATION FUNCTIONS INCLUDE FILENAME MANIPULATION        *
32  *         AND FILE/DEVICE STATUS ACQUISITION.                             *
33  *                                                                         *
34  *         PROGRAMMED BY C.A. FELIPPA, OCT 1975  (HALLOWEEN DAY)           *
35  *         UPDATE -  OCT 1977 (HALLOWEEN DAY)                              *
36  *                                                                         *
37  ***************************************************************************
38  *                                                                         *
39  *         A SUMMARY LIST OF PROCEDURES FOLLOWS.                           *
40  *                                                                         *
41  *         FETSET$   SETS UP A FILE ENVIRONMENT TABLE (FET)                *
42  *                                                                         *
43  *         FETRET$   EXTRACTS RETURNS PARAMETERS FROM CURRENT FET.         *
44  *                                                                         *
45  *         IOMLDIX   EXTRACTS INFORMATION PERTAINING TO A LOGICAL          *
46  *                   DEVICE INDEX IN FORMAT SUITABLE FOR DISPLAY.          *
47  *                                                                         *
48  *         IOMLFN    QUERIES STATUS OF FILENAME IN RELATION TO JOB         *
49  *                                                                         *
50  *         IOMQFC    BREAKS UNIVAC-TYPE DEVICE NAME INTO QUALIFIER         *
51  *                   (=OWNER'S ID), FILENAME, AND FILE CYCLE               *
52  *                                                                         *
53  *         LFNBF     (ALT COMPASS ENTRY LFNBF$) BLANKFILLS A LFN           *
54  *                                                                         *
55  *         LFNZF     (ALT COMPASS ENTRY LFNZF$) ZERO FILLS A LFN           *
56  *                                                                         *
57  *         LJRJN    LEFTJUSTIFY A RIGHT-JUSTIFIED NAME
58  *                                                                         *
59  *         LMXXXX    WHERE XXXX =  EQPC,DLOC,NEXT,SECT,UNIT   ARE          *
60  *                   FUNCTIONS TO GET AST INFORMATION FOR A GIVEN LDI.     *
61  *                                                                         *
62  *         RFNBF     (ALT COMPASS ENTRY RJNBF$) BLANKFILLS A
63  *                   ZEROFILLED RIGHT-JUSTIFIED NAME STRING
64  *                                                                         *
65  *         NCOCTL$   COMPASS-CALLABLE PROCEDURE FOR CONVERTING AN          *
66  *                   1-9 DIGIT INTEGER TO OCTAL DISPLAY CODE               *
67  *                                                                         *
68  ***************************************************************************
69  FETSET$   SPACE     2
70  ***       FETSET$
71  *
72  FETSET$   SPACE     2
73  *
74  *         COMPASS-CALLABLE PROCEDURE FOR SETTING UP
75  *         A FILE ENVIRONMENT TABLE (FET)
76  *
77  *         COMPASS REFERENCE -
78  *
79  *         RJ        FETSET$
80  *
81  *         ENTRY REGISTER SET -
82  *         (X1)      ADDRESS(42/LFN,18/FNT-POINTER)
83  *                   (LAST FIELD OPTIONAL)
84  *         (X2)      48/0,3/R,3/EP,3/XP,3/FETL,    WHERE
85  *                   R = RANDOM ACCESS BIT, EP = ERROR PROCESSING BIT,
86  *                   XP = EXTENDED ERROR PROC BIT, FETL = SIZE(FET)-5
```

```
                NOZL3D -        IOMFIP
 87  *              (X3)        ADDRESS(BUFFER)
 88  *              (X4)        N = SIZE OF BLOCK TO BE XMITTED
 89  *              (X5)        0  IF READ CONDITION,   N  IF WRITE
 90  *              (X6)        LIMIT-ADDRESS(BUFFER)-N
 91  *
 92  *              EXIT REGISTER CONFIGURATION -
 93  *              (B1)=1, (B7)=1, (B6)=2
 94  *              B2,B3,B4,B5,A0,A1,A2,A3,X1,X3          PRESERVED
 95  *              A4,A5,A6,A7,X0,X2,X4,X5,X6,X7          DESTROYED
 96  *              ENTRY VALUES OF (X4) AND (X5) PLACED IN NWXF AND NWXWRT
 97  *              (BLOCK /CDMAST/), RESPECTIVELY.
 98  *
 99  *
100  *              EXIT FET CONFIGURATION (SCOPE) -
101  *
102  *  WORD /  BIT     5         4         3         2         1
103  *          9876543210987654321098765432109876543210987654321098765432 10
104  *  FET+0   ----------LOGICAL-FILENAME----------.....................11
105  *  FET+1   ...........R..E...X.................FETL-------FIRST------
106  *  FET+2   ..................................................--------IN--------
107  *  FET+3   ..................................................--------OUT-------
108  *  FET+4   -FNTPOINTER-.....................................-------LIMIT------
109  *  FET+5   ..........................................................
110  *  FET+6   ...........-(FETEXT-POINTER)-.....................................
111  *  FET+7   ..........................................................
112  *  FET+8   ...........-EOI-XFER-ADDRESS-..........---ERROR-ADDRESS---
113  *
114  *              WHERE -
115  *                      ZERO BIT
116  *              FIRST   ADDRESS(BUFFER)
117  *              IN      ADDRESS(BUFFER)      ON READ-TYPE CONDITION
118  *                      ADDRESS(BUFFER)+N    ON WRITE-TYPE CONDITION
119  *              OUT     ADDRESS(BUFFER)
120  *              LIMIT   ADDRESS(BUFFER)+N+(X6)
121  *              FETEXT POINTER      ONLY SET IF XP-BIT = 1
122  *
123  *              FOR NOS, WORDS FET+6 AND FET+8 ARE ZERO, AND THE XP BIT
124  *              (WORD FET+1) HAS NO EFFECT.
125  *
126                  ENTRY   FETSET$
127  FETSET$         BSSZ    1               ENTRY/EXIT
128                  SB7     1               (B7) = 1
129                  BX7     X4              (X7) = N
130                  IX4     X3+X4           (X4) = ADDRESS(BUFFER)+N
131                  SB6     B7+B7           (B6) = 2
132                  NZ      X6,*+1
133                  SX6     B7              IF (X6) = 0, SET (X6) = 1
134  +               SA7     NWXF            SAVE N IN NWXF
135                  BX7     X5
136                  IX6     X4+X6           (X6) = LIMIT
137                  SA7     A7+B7           SAVE ENTRY (X5) IN NWXWRT
138                  MX7     0               (X7) = 0
139                  SA6     FET+4           SAVE LIMIT IN FET+4 = FET(5)
140                  IFEQ    OS,SCOPE
141                  SX6     CPCERR          FETCH ERROR-XFER ADS            (SCOPE)
142                  BX0     X6              (X0) = ERROR XFER ADS           (SCOPE)
143                  LX0     30                                              (SCOPE)
144                  BX6     X0+X6           COMPLETE ASSEMBLY OF FET(9)     (SCOPE)
145                  ELSE
146                  MX6     0               (X6) = 0                          (NOS)
147                  ENDIF
148                  SA7     RETCOD          CLEAR RETCOD
149                  SB1     X1              SAVE (X1) IN B1
150                  SA7     A7+B7           CLEAR EOFCOD
151                  SA6     FET+8           STORE FET(9)
152                  SA7     A7+B7           CLEAR STATUS
153                  SA7     A7+B7           CLEAR TAPERR/DTLERR
154                  SA7     A7+B7           CLEAR RSKCNT
155                  BX6     X3              (X6) = OUT = ADDRESS(BUFFER)
156                  SA7     A7+B7           CLEAR NWRDXF
157                  SA7     A6-B7           CLEAR FET(8)
158                  MX0     42D             (X0) = LFN MASK
159                  SA7     A7-B7           CLEAR FET(7)
160                  SA7     A7-B7           CLEAR FET(6)
161                  IX7     X3+X5           (X7) = IN =  ADDRESS(BUFFER)+(X5)
162                  SA6     A7-B6           FET(4) = OUT
163                  SA5     X1              (X5) = LFN/FNTPNT
164                  SA7     A6-B7           FET(3) = IN
165                  SX1     B6+B7           (X1) = 3
166                  BX6     X0*X5           (X6) = ISOLATED LFN
167                  BX5     -X0*X5          (X5) = ISOLATED FNTPNT
168                  SA4     A7+B6           (X4) = LIMIT = FET(5)
169                  BX6     X6+X1           SET INTERLOCK AND XMISSION MODE BITS
170                  MX0     -3              (X0) = OCTAL DIGIT MASK
171                  SA6     A7-B6           STORE FET-HEADER IN FET(1)
172                  LX5     48D             (X5) = LEFTJUSTIFIED FNTPNT
173                  BX1     -X0*X2          (X1) = FETL
```

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                NOZL3D -        IOMFIP
174             BX7     X5+X4           (X7) = MERGED FNTPNT/LIMIT FIELDS
175             AX2     3               RIGHTJUSTIFY R/E/X BITS FIELD
176             SA7     A4              STORE FET(5)
177             BX4     -X0*X2          (X4) = XP BIT
178             BX2     X0*X2           CLEAR XP-BIT FIELD
179             LX2     1               SHIFT R/E BITS TO PROPER DISTANCE
180             BX2     X2+X4           REINSERT XP BIT
181             LX1     18D             ROTATE FETL
182             LX2     40D             POSITION R/E/X FIELDS
183             BX1     X1+X3           (X1) = MERGED FETL/FIRST FIELDS
184             BX6     X1+X2           (X6) = MERGED R/E/X/FETL/FIRST FIELDS
185             SA6     A6+B7           STORE FET(2)
186             SX1     B1              RESTORE (X1)
187             SB1     B7              (B1) = 1  FOR NOS
188             IFEQ    OS,SCOPE
189             ZR      X4,FETSET$      EXIT IF XP=0
190             SX7     FETEXT          (X7) = ADDRESS OF FET EXTENSION
191             SX6     B7              (X6) = 1
192             SA6     X7              FETX(1) = 1
193             LX7     30D             ROTATE ADDRESS TO BITS 30-47
194             SA7     A7+B6           STORE FETX-PNT IN FET(7)
195             ENDIF
196             EQ      FETSET$         RETURN TO PROCEDURE CALLER
197 *
198 ***     FETSET  (LFN, X2, BUFFER, N, NWRT)
199 *
200 *
201 *       FORTRAN-CALLABLE FORM OF FETSET$.  USED PRIMARILY
202 *       FOR DEBUGGING PURPOSES
203 *
204 *       FORTRAN REFERENCE
205 *
206 *       CALL    FETSET  (LFN, X2, A, N, NWRT)
207 *
208             ENTRY   FETSET
209 FETSET      BSSZ    1
210             SB7     1                                               (FTN)
211             SA2     A1+B7                                           (FTN)
212             SA3     A2+B7                                           (FTN)
213             SA2     X2                                              (FTN)
214             SA4     A3+B7                                           (FTN)
215             SA5     A4+B7                                           (FTN)
216             SA4     X4                                              (FTN)
217             SA5     X5                                              (FTN)
218             SX6     B7
219             RJ      FETSET$
220             EQ      FETSET          RETURN TO FORTRAN PROGRAM
221 *
222 FETRET$    SPACE   2
223 ***         FETRET$
224 *
225 *       COMPASS-CALLABLE PROCEDURE TO EXTRACT STATUS PARAMETER
226 *       FIELDS FROM THE F.E.T. AND PUT'EM IN SINGLE WORDS
227 *
228 *       COMPASS REFERENCE -
229 *
230 *       RJ      FETRET$
231 *
232 *       EXIT VALUES -
233 *
234 *       (B7)=1, (B6)=2, (X1)=STATUS
235 *       RETCOD,EOICOD,STATUS,DTLERR      STORED IN /CDMAST/
236 *       NWRDXF    UPDATED BY  OUT-IN+NWXWRT
237 *
238 *       REGISTER UTILIZATION -
239 *       B1,B2,B3,B4,B5,A0,A4,A5,X0,X4,X5    PRESERVED
240 *       A1,A2,A3,A6,A7,X1,X2,X3,X6,X7       DESTROYED
241 *
242             ENTRY   FETRET$
243 FETRET$    BSSZ    1               ENTRY/EXIT
244             SB7     1
245             SA1     FET+0           (X1) = FET HEADER
246             SB6     B7+B7           (B6) = 2
247             MX6     -9D             (X6) = RETURN CODE MASK
248             SA2     A1+B6           (X2) = IN = FET+2
249             BX6     -X6*X1          (X6) = RETCOD
250             SA3     A2+B7           (X3) = OUT = FET+3
251             SA6     RETCOD          STORE RETURN CODE
252             AX1     9               RIGHTJUSTIFY EOI INDICATOR
253             MX6     -1
254             IX7     X3-X2           (X7) = OUT-IN
255             SA2     NWXWRT          (X2) = NWXF ON WRITE OP, ELSE 0
256             SA3     NWRDXF          (X3) = CURRENT NWRDXF
257             SA7     OUTMIN          PLACE (OUT-IN) IN OUTMIN
258             BX6     -X6*X1          (X6) = EOICOD
259             IX7     X2-X7           (X7) = IN-OUT+NWXWRT
260             SA6     A6+B7           STORE EOICOD
```

```
261             IX7     X7+X3
262             SA7     A3              STORE UPDATED NWRDXF
263             IFEQ    OS,SCOPE
264             SA1     A6+B7           FETCH STATUS WORD               (SCOPE)
265             ELSE
266             AX1     1               RIGHTJUSTIFY ABT CODE             (NOS)
267             MX6     -4                                                (NOS)
268             BX6     -X6*X1          (X6) = ABT CODE                   (NOS)
269             LX1     X6                                                (NOS)
270             SA6     A6+B7           STORE IN STATUS                   (NOS)
271             ZR      X6,FETRET$                                        (NOS)
272             SA1     FET+6                                             (NOS)
273             SX2     X6-11B                                            (NOS)
274             MX3     -12D                                              (NOS)
275             BX6     -X3*X1                                            (NOS)
276             NZ      X2,FETRET$                                        (NOS)
277             SA6     A6+B7           STORE DETAILED ERROR CODE         (NOS)
278             ENDIF
279             EQ      FETRET$         RETURN
280 CPCERR     SPACE   2
281 ***         CPCERR
282 *
283 *           OWNCODE ERROR PROCESSING PROCEDURE.  NOTE THAT THIS
284 *           CODE BLOCK USES ONLY REGISTERS A1,X1,A6,X6,X0.   THIS
285 *           IS IMPORTANT, FOR CPC USES ONLY THE 1ST FOUR.
286 *
287             IFEQ    OS,SCOPE
288 CPCERR      BSSZ    1                                                 (SCOPE)
289             BX6     X1                                                (SCOPE)
290             AX1     9D              RIGHTJUSTIFY STATUS FIELD         (SCOPE)
291             SA6     FET             FIX TO GODDAMN SCOPE, 5/79        (SCOPE)
292             MX0     -5              MASK FOR STATUS FIELD             (SCOPE)
293             BX6     -X0*X1          (X6) = STATUS                     (SCOPE)
294             SA1     FET+6           (X1) = FET(7)                     (SCOPE)
295             SA6     STATUS          STORE STATUS WORD                 (SCOPE)
296             AX1     30D             RIGHTJUSTIFY FETX-PNT FIELD       (SCOPE)
297             ZR      X1,CPCERR       RETURN IF XP=0                    (SCOPE)
298             SA1     X1              (X1) = FET EXTENSION WORD         (SCOPE)
299             BX6     X1              SAVE (X1) IN (X6)                 (SCOPE)
300             AX6     18D             RIGHTJUSTIFY DETAILED ERROR       (SCOPE)
301             BX6     -X0*X6          (X6) = TAPERR                     (SCOPE)
302             AX1     24D             RIGHTJUSTIFY RES SKIP COUNT       (SCOPE)
303             MX0     -16D                                              (SCOPE)
304             SA6     A6+B7           STORE TAPERR                      (SCOPE)
305             BX6     -X0*X1          (X6) = RSKCNT                     (SCOPE)
306             SA6     A6+B7           STORE RSKCNT                      (SCOPE)
307             EQ      CPCERR          TO CPC EXIT WORD                  (SCOPE)
308             ENDIF
309 IOMLDIX     SPACE   2
310 ***         IOMLDIX
311 *
312 *           EXTRACT INFORMATION PERTAINING TO A LOGICAL DEVICE INDEX
313 *           (LDIX) AND PLACE IT IN FORMAT SUITABLE FOR TABLE PRINT
314 *           BY SUBROUTINE IOMTAB.
315 *           ALL INPUT/OUTPUT IS DONE THROUGH BLOCK /CDMPAD/.
316 *
317             ENTRY   IOMLDIX
318 IOMLDIX     BSSZ    1
319             SA1     LDIX            (X1) = LDI INDEX
320             SB7     1               (B7) = 1
321             SB2     MAXLDI          (B2) = MAXLDI = AST ROW DIMENSION
322             SB1     X1              (B1) = LDI
323             SB6     B7+B7           (B6) = 2
324             SA3     B1+ASTYPE-1     (X3) = ASTYPE(LDI)
325             SB3     B2+B2           (B3) = 2*MAXLDI
326             SA2     A3-B2           (X2) = ASTOPT(LDI)
327             SA5     A3+B3           (X5) = ASTLOC(LDI) = CDLOC
328             SX7     X3-4            (X7) = ASTYPE(LDI)-4 = TYPEX
329             BX6     X2              (X6) = OPTX
330             SA7     TYPEX           STORE TYPEX
331             SA1     ASTSEC+4+X7     (X1) = ASTSEC(TYPEX+4) = SECTOR
332             SA6     A7+B7           STORE OPTX
333             BX6     X5              (X6) = CDLOC
334             SA2     A5+B2           (X2) = ASTNXT(LDI)
335             SA6     A6+B6           STORE CDLOC
336             BX7     X1              (X7) = SECTOR
337             SA1     =10H            (X1) = BLANK WORD
338             SB4     X7              SAVE SECTOR IN (B4)
339             SA3     A2+B2           (X3) = ASTLIM(LDI)
340             SA7     A7+B6           STORE SECTOR
341             SA4     A3+B2           (X4) = ASTWXR(LDI)
342             BX6     X2              (X6) = NEXT
343             SA5     A4+B2           (X5) = ASTWXW(LDI)
344             BX7     X3              (X7) = LIMIT
345             SA6     A6+B7           STORE NEXT
346             BX6     X1              (X6) = BLANK
347             SA7     A6+B7           STORE LIMIT
```

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                NOZL3D -        IOMFIP
348             SA6     A6+B6           STORE TRANSPARENT FULL DEV MARK
349             LX7     X4              (X7) = KWXRED
350             BX6     X5              (X6) = KWXWRT
351             SA4     ASTCNT          (X4) = KACTVD (ACTIVE DEVICE COUNTER)
352             SA7     A7+B6           STORE KWXRED
353             SA6     A6+B6           STORE KWXWRT
354             SX6     X4+B7
355             BX0     X1              SAVE BLANK WORD IN (X0)
356             SA6     A4              STORE INCREMENTED KACTVD
357             SA5     A4+B7           (X5) = KFULLD (FULL   DEVICE COUNTER)
358             PL      X3,IOMLD11      TEST FOR FULL DEVICE (NEG LIMIT)
359             SX7     1R*
360             LX7     54D
361             SX6     X5+B7           INCREMENT KFULLD BY 1
362             SA7     A7-B7           STORE FULL DEVICE MARK
363             SA6     A5              STORE UPDATED KFULLD
364 IOMLD11     BSS     0
365             SA1     TABFMT14        (X1) = TABFMT(1)
366             BX5     X0              (X5) = TABFMT(5) (DIR. ACCESS DEVICE)
367             SA2     A1+B7           (X2) = TABFMT(2)
368             SA3     A1+B6           (X3) = TABFMT(3)
369             BX6     X1
370             SA6     TABFMT+0        STORE TABFMT(1)
371             BX7     X2
372             SA4     A3+B7           (X4) = TABFMT(4) (DIR. ACCESS DEVICE)
373             BX6     X3
374             SA7     A6+B7           STORE TABFMT(2)
375             SA1     A4+B7           (X1) = TABFMT(6)
376             SA2     A4+B6           (X2) = TABFMT(7)
377             SA6     A6+B6           STORE TABFMT(3)
378             BX7     X0              (X7) = BLANK
379             GT      B4,IOMLD12      BRANCH AS PER SECTOR VALUE
380             SA4     A2+B7           (X4) = TABFMT(4)  (TAPE DEVICE)
381             SA5     A2+B6
382             SA7     LIMIT           BLANK OUT LIMIT  WORD
383             SA7     SECTOR          BLANK OUT SECTOR WORD
384 IOMLD12     BSS     0
385             LX6     X4
386             BX7     X5
387             SA6     A6+B7           STORE TABFMT(4)
388             BX6     X1
389             SA7     A6+B7           STORE TABFMT(5)
390             BX7     X2
391             SA1     ASTLFN-1+B1     (X1) = ASTLFN(LDI)
392             SA6     A6+B6           STORE TABFMT(6)
393             SA5     A1-B2           (X5) = PFN = ASTPFN(LDI)
394             SA7     A7+B6           STORE TABFMT(7)
395             BX7     X5
396             SA7     PFN
397             RJ      LFNBF$          BLANKFILL LFN IN (X6)
398             SA6     LFNAME          STORE BLANK-PADDED LFN
399             ZR      X5,IOMLDIX      EXIT IF PFN=0 (LOCAL FILE)
400             BX1     X5              (X1) = PFN
401             RJ      LFNBF$          BLANKFILL PFN IN (X6)
402             MX0     -6
403             SA6     PFN             STORE BLANK-PADDED PFN
404             BX6     -X0*X5          (X6) = PFN CYCLE
405             SA6     A6+B7           STORE PFNCY
406             SA1     A5-B2           (X1) = PFNID = ASTQFR(LDI)
407             RJ      RFNBF$          BLANKFILL PFNID IN (X6)
408             SA6     PFNID           STORE BLANK-PADDED PFNID
409             EQ      IOMLDIX         RETURN TO CALLING PROGRAM
410 TABFMT14     DIS     4,(2H +13,  2XA7,2X04, 2I4,     I4,3I7,
411 TABFMT67     DIS     2,A1,2I8,2H +)
412 TABFMT45     DIS     2,A4,1X06,1X06,A7,              (TAPE DEVICE)
413 LDIX        EQU     PAD+64
414 LFNAME      EQU     PAD+65
415 EQCODE      EQU     PAD+66
416 TYPEX       EQU     PAD+67
417 OPTX        EQU     PAD+68
418 SECTOR      EQU     PAD+69
419 CDLOC       EQU     PAD+70
420 NEXT        EQU     PAD+71
421 LIMIT       EQU     PAD+72
422 MARK        EQU     PAD+73
423 KWXRED      EQU     PAD+74
424 KWXWRT      EQU     PAD+75
425 PFN         EQU     PAD+76
426 PFNCY       EQU     PAD+77
427 PFNID       EQU     PAD+78
428 TABFMT      EQU     PAD+80
429 *
430 IOMLFN      SPACE   2
431 ***         IOMLFN  (LFN)
432 *
433 *           FUNCTION TO QUERY STATUS OF LOGICAL FILE NAME IN
434 *           RELATION TO JOB
```

```
                NOZL3D -        IOMFIP
435  *
436  *          FORTRAN REFERENCE -
437  *
438  *          LFNST =   IOMLFN  (LFN)
439  *
440  *          WHERE
441  *
442  *          LFN       LOGICAL FILENAME
443  *
444  *          IOMLFN    ZERO,  LFN IS NOT ASSIGNED TO JOB
445  *                    NEGATIVE,  LFN IS A LOCAL FILE
446  *                    POSITIVE, LFN IS ATTACHED PERM FILE
447  *                    BITS 0-4 OF IOMLFN CONVEY INFORMATION AS
448  *
449  *                    REGARDS ACCESS PERMISSIONS (SEE SCOPE 3.4 MANUAL)
450                  ENTRY     IOMLFN
451  IOMLFN          BSS       1               ENTRY/EXIT
452                  MX7       0               (X7) = 0
453                  SA5       X1              LFN TO (X5)                     (FTN)
454                  SA7       FET+2
455                  SB7       1
456                  SA7       A7-B7
457                  MX0       42D             GENERATE LFN MASK
458                  SA6       A7-B7           SET LIST HEADER
459                  BX6       X0*X5
460                  SA6       A7              STORE LFN
461                  IFEQ      OS,SCOPE
462                  PERM      FET,RC          PERM MACRO                      (SCOPE)
463                  ENDIF
464                  SA5       FET             (X5) = EXIT WORD
465                  MX0       -9D
466                  AX5       9D              RIGHTJUSTIFY RETURN FIELD
467                  BX5       -X0*X5          EXTRACT RETURN FIELD
468                  SX6       X5              PLACE IN (X6)
469                  AX5       4               RIGHTJUSTIFY BIT 13
470                  ZR        X5,IOMLFN       EXIT IF PERM OR NONEXISTING FILE
471                  BX6       -X6             COMPLEMENT (X6) IF LOCAL FILE
472                  EQ        IOMLFN          RETURN
473  *
474  IOMQFC          SPACE     2
475  ***             IOMQFC    (EDN, QFC)
476  *
477  *          TO BREAK DOWN UNIVAC-TYPE DEVICE NAME TEXTSTRING INTO
478  *          PRIMITIVE COMPONENTS - QUALIFIER, FILENAME, CYCLE
479  *
480  *          FORTRAN REFERENCE -
481  *
482  *          CALL      IOMQFC  (EDN, QFC)
483  *
484  *          WHERE
485  *
486  *          EDN       EXTERNAL DEVICE NAME SUPPLIED (AS 2ND ARGUMENT)
487  *                    TO DMDAST.  ITS GENERAL FORM IS
488  *                    QUALIFIER*FILENAME(FCYCLE), 20 CHARS MAX
489  *                    FIRST/LAST COMPONENTS ARE OPTIONAL
490  *
491  *          QFC       THREE WORD OUTPUT ARRAY RECEIVING -
492  *                    QFC(1)    QUALIFIER (1-7 CHARS) RJ, ZEROFILLED
493  *                    QFC(2)    FILENAME  (1-7 CHARS) LJ, ZEROFILLED
494  *                    QFC(3)    DECODED CYCLE NUMBER
495  *                    IF ANY COMPONENT IS MISSING, THE CORRESPONDING
496  *                    ENTRY OF QFC WILL RECEIVE ZERO.
497  *
498                  ENTRY     IOMQFC
499  GETQFC          BSS       0
500  IOMQFC          BSSZ      1
501                  SB7       1               (B7) = 1
502                  MX0       6               (X0) = CHAR MASK
503                  SA2       A1+B7           (X2) = ADDRESS(QFC)             (FTN)
504                  MX6       0               (X6) = 0                        (FTN)
505                  SA1       X1              (X1) = EDN(1)                   (FTN)
506                  MX7       0               (X7) = 0                        (FTN)
507                  SA2       X2              (A2) POINTS TO QFC(1)           (FTN)
508                  SB6       1R(             (B6) = FCYCLE DELIMITER
509                  SB5       1R*             (B5) = QUALIFIER DELIMITER
510                  SA6       A2              QFC(1) = 0
511                  SA7       A2+B7           QFC(2) = 0
512                  SX5       -2              (X5) = - MAX. WORDS IN EDN
513                  SB3       60-48           (B3) = 60-48, 48 BEING MAX BITS/QF
514                  SB4       1R9             (B4) = LARGEST ALPHANUMERIC CHAR
515                  LX0       6               (X0) = RIGHT JUSTIFIED CHAR MASK
516                  SA6       A7+B7           QFC(3) = 0
517                  SX4       1R0             (X4) = 1R0 FOR FCYCLE DECODE
518  *
519  GETQFC1          BSS       0
520                   MX6       0               (X6) = 0
521                   SB2       60              INITIALIZE (X6)-LJ COUNTER
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522              MX7       0
523  GETQFC2     BSS       0
524              LX1       6              RIGHTJUSTIFY NEXT CHAR
525              BX2       X0*X1          ISOLATE CHAR IN (X2)
526              SB1       X2             PLACE CHAR IN (B1) FOR TESTS
527              BX1       -X0*X1         CLEAR VACATED POSITION IN (X1)
528              EQ        B1,GETQFC7     GET OFF SCANLOOP ON ZERO BYTE
529              GT        B1,B4,GETQFC4  TEST FOR SPECIAL CHAR (CODE GT 1R9)
530              LE        B2,B3,GETQFC3  LIMIT (X6)STRING TO 7 CHARACTERS
531              LX6       6              FOREPLAY ON (X6)
532              SB2       B2-6           DECREMENT LEFTJUSTIFIER COUNT
533              BX6       X2+X6          SIX BITS TO PASSION PIT
534              LX7       B2,X6          (X7) = LEFTJUSTIFIED OUTPUT STRING
535  GETQFC3     BSS       0
536              NZ        X1,GETQFC2     TEST FOR SOURCE STRING EXHAUSTION
537              SX5       X5+B7          INCREMENT EDN WORD COUNT
538              SA1       A1+B7          LOAD NEXT EDN WORD IN (X1)
539              NG        X5,GETQFC2     CONTINUE SCAN IF (X5) LT 0
540              EQ        GETQFC7        ELSE GET OFF LOOP
541  GETQFC4     BSS       0              SPECIAL CHAR TESTS FOLLOW
542              NE        B1,B5,GETQFC5  TEST FOR ASTERISK (QUAL DELIMITER)
543              SB3       18
544              SA6       A2             STORE QUALIFIER IN QFC(1)
545              SB5       B0             DEFUSE QUAL DELIMITER TRAP
546              NZ        X1,GETQFC1     RESUME SCAN FROM TOP IF (X1)NZ
547              EQ        GETQFC6
548  GETQFC5     BSS       0
549              NE        B1,B6,GETQFC7  ABANDON SCAN ON ANY SPEC CHAR BUT 1R(
550              SA7       A7             STORE FILENAME IN QFC(2)
551              SB6       B0             TURN OFF CYCLE DELIMITER TRAP
552              NZ        X1,GETQFC1     RESUME SCAN FROM TOP IF (X1)NZ
553  GETQFC6     BSS       0
554              SX5       X5+B7          INCREMENT EDN WORD COUNT
555              SA1       A1+B7          LOAD NEXT EDN WORD IN (X1)
556              NG        X5,GETQFC1     CONTINUE SCAN IF (X5) LT 0
557  *
558  GETQFC7     BSS       0              TERMINATION SECTION FOLLOWS
559              EQ        B6,GETQFC8     TEST FOR NAME/CYCLE
560              SA7       A7             STORE FILENAME IN QFC(2)
561              EQ        IOMQFC         EXIT
562  GETQFC8     BSS       0              FILE CYCLE DECODING FOLLOWS
563              BX7       X0*X6          (X7) = ENCODED LAST FC DIGIT
564              AX6       6
565              BX6       X0*X6          (X6) = ENCODED FIRST FC DIGIT IF ANY
566              SB1       X6
567              IX7       X7-X4          CONVERT FIRST DIGIT TO NUMERIC
568              GT        B1,B4,GETQFC10
569              IX6       X6-X4          CONVERT FIRST DIGIT TO NUMERIC
570              SB1       X6
571              LX6       3
572              LE        B1,GETQFC10
573              IX7       X6+X7
574              SB1       B1+B1
575              SX7       X7+B1          (X7) = DECODED FILE CYCLE
576  GETQFC10    BSS       0
577              SA7       A7+B7          STORE FILE CYCLE IN QFC(3)
578              EQ        IOMQFC         EXIT
579  LFNBF       SPACE     2
580  ***         LFNBF     (LFN)
581  *
582  *           FUNCTION PROCEDURE TO BLANKFILL A LOGICAL FILE NAME WORD.
583  *
584  *           FORTRAN REFERENCE&
585  *
586  *           LFNB =    LFNBF (LFN)
587  *
588  *           WHERE LFN IS WORD HOLDING A ZERO-FILLED LFN STRING
589  *
590  *           COMPASS REFERENCE -
591  *
592  *           (X1) =    LFN
593  *           RJ        LFNBF$
594  *
595  *           THE RESULT RETURNS IN THE FUNCTION REGISTER (X6)
596  *           (B6),(B7) ARE SET TO 2,1 RESPECTIVELY.
597  *
598  *
599               ENTRY     LFNBF,LFNBF$
600  LFNBF$      BSS       1              COMPASS-CALLABLE ENTRY POINT
601              MX6       60D            (X6) = FULL WORD MASK
602              SB6       7              (B6) = MAX. CHARS IN LFN
603              BX2       X1             (X2) = INPUT LFN
604              MX3       6              (X3) = CHAR EXTRACTION MASK
605              SB7       1              (B7) = 1
606  LFNBF1      BSS       0
607              BX1       X3*X2          ISOLATE CHARACTER IN (X1)
608              ZR        X1,LFNBF2      EXIT LOOP ON ZERO BYTE
```

```
                NOZL3D -        10MFIP
609                BX6     -X3*X6          CLIP MASK
610                SB6      B6-B7          DECREMENT COUNTER
611                LX3      54D            ROTATE (X3) ONE CHAR RIGHT
612                GT       B6,LFNBF1      CYCLE IF LESS THAN 7 CHARS PROCESSED
613  LFNBF2    BSS      0
614                SA1      =10H           (X1) = BLANK WORD
615                BX2      -X6*X2         CLEAR TRAILING GARBAGE
616                SB6      B7+B7          (B6) = 2
617                BX1      X6*X1          CLIP BLANKFILL
618                BX6      X1+X2          FORM RESULT
619                EQ       LFNBF$         RETURN
620  LFNBF     BSS      1               FORTRAN-CALLABLE ENTRY
621                SA1      X1             (X1) = LFN                          (FTN)
622                RJ       LFNBF$
623                EQ       LFNBF
624  LFNINC    SPACE    2
625  ***       LFNINC(LFN)
626  *
627  *         FUNCTION PROC TO INCREMENT LAST CHAR OF LOGICAL FILENAME
628  *
629               ENTRY    LFNINC
630  LFNINC    BSS      1               ENTRY POINT
631               SA1      X1             (X1) = LFN                          (FTN)
632               SB7      1              (B7) = 1
633               MX0      -6             (X0) = CHAR EXTRACTION MASK
634               SB5      18
635               SB6      54
636               MX2      18
637               AX1      18
638               SX7      B7             (X7) = 1
639               BX1      -X2*X1
640  LFNINC1    BSS      0
641               BX2      -X0*X1         ISOLATE CHAR IN (X2)
642               NZ       X2,LFNINC2     EXIT LOOP ON NONZERO BYTE
643               SB5      B5+6           ADVANCE SHIFT COUNT
644               AX1      6              NEXT CHAR INTO POSITION
645               LT       B5,B6,LFNINC1  CYCLE
646  LFNINC2   BSS      0
647               IX6      X1+X7          FORM RESULT IN (X6)
648               LX6      B5,X6          LEFTJUSTIFY STRING
649               EQ       LFNINC         RETURN
650  LFNZF     SPACE    2
651  ***       LFNZF    (LFN)
652  *
653  *         FUNCTION PROCEDURE TO ZEROFILL A LFN STRING.  LAST 18
654  *         BITS ARE NOT MODIFIED.
655  *
656  *         FORTRAN REFERENCE -
657  *
658  *         LFNZ =    LFNZF (LFN)
659  *
660  *         WHERE LFN IS A WORD CONTAINING A LFN STRING DELIMITED
661  *         BY ZERO BYTE OR A SPECIAL CHARACTER (CODE GT 44B)
662  *
663  *         COMPASS REFERENCE -
664  *
665  *         (X1) =    LFN
666  *         RJ        LFNZF$
667  *
668  *         RESULT RETURNS IN THE FUNCTION REGISTER (X6)
669  *
670  *
671  *         REGISTERS USED BY LFNZF$& X0,X2,X3,B2,B3
672  *         (B6),(B7) SET TO 2,1, RESP., (B4) RESTORED.
673  *
674               ENTRY    LFNZF,LFNZF$
675  LFNZF2    BSS      0
676               BX6      -X6*X1         INJECT ZERO FILL
677               SB6      B7+B7          (B6) = 2
678               SB4      X3             RESTORE (B4)
679  LFNZF$    BSS      1               COMPASS-CALLABLE ENTRY
680               SX3      B4
681               MX0      6              (X0) = CHAR EXTRACTION MASK
682               SB6      7              (B6) = MAX LFN CHARS
683               SB4      B0
684               MX6      42D            42-BIT MASK IN (X6)
685               SB3      1R9            (B3) = 44B FOR SPECIAL CHAR TESTS
686               SB7      1              (B7) = 1
687  LFNZF1    BSS      0
688               BX2      X0*X1          ISOLATE CHAR IN (X2)
689               SB4      B4+6           INCREMENT NOMINAL SHIFT COUNTER
690               SB6      B6-B7          DECREMENT CHAR COUNTER
691               LX2      B4,X2          RIGHTJUSTIFY CHARACTER
692               SB2      X2             (B2) = CHAR TO TEST
693               EQ       B2,LFNZF2      EXIT LOOP ON ZERO BYTE
694               GT       B2,B3,LFNZF2   OR SPECIAL CHARACTER
695               BX6      -X0*X6         ZERO WINDOW ON MASK WORD
```

```
                NOZL3D -        IOMFIP
696                 LX0         54D             ROTATE (X0) TO NEXT CHAR POSITION
697                 GT          B6,LFNZF1       CYCLE IF LESS THAN 7 CHARS PROCESSED
698                 EQ          LFNZF2
699 LFNZF       BSS         1               FORTRAN-CALLABLE ENTRY
700             SA1         X1              (X1) = LFN                          (FTN)
701             RJ          LFNZF$
702             EQ          LFNZF
703 *
704 LJRJN       SPACE       2
705 ***         LJRJN  (RJN)
706 *
707 *           TO LEFTJUSTIFY A RIGHTJUSTIFIED NAME STRING
708 *
709 *           FORTRAN REFERENCE -
710 *
711 *           NAME =      LJRJN (RJN)
712 *
713 *           WHERE
714 *
715 *           RJN         RIGHTJUSTIFIED TEXTSTRING WITH ZERO/BLANK FILL
716 *           LJRJN       LEFTJUSTIFIED NAME WITH SAME FILL TYPE
717 *
718             ENTRY       LJRJN
719 LJRJN       BSS         1
720             SA1         X1                                                  (FTN)
721             SB6         10
722             MX2         -6
723             SB3         1R9
724             BX6         X1
725             LX1         6
726 LJRJN1      BSS         0
727             BX2         -X2*X1
728             SB6         B6-1
729             SB2         X2
730             EQ          B2,LJRJN2
731             LE          B2,B3,LJRJN
732 LJRJN2      LX1         6
733             MX2         -6
734             LX6         6
735             GT          B6,LJRJN1
736             EQ          LJRJN
737 LMXXXX      SPACE       2
738 ***         LMDLOC (LDI)        LMEQPC(LDI)         LMIFNM(LDI)
739 ***         LMLIMT (LDI)        LMNEXT(LDI)         LMSECT(LDI)
740 ***         LMUNIT (LDI)
741 *
742 *           USER-PROGRAM CALLABLE ENTRIES TO RETRIEVE AST
743 *           DATA PERTAINING TO A LOGICAL DEVICE INDEX (LDI)
744 *
745 *           FORTRAN REFERENCE -
746 *           INF =       LM XXXX (LDI)
747 *
748 *           WHERE  XXXX = EQPC, DLOC, NEXT, SECT, UNIT  TO RETRIEVE
749 *           EQUIPMENT CODE, CURRENT DEVICE LOCATION, NEXT FREE
750 *           LOCATION, SECTOR SIZE, AND UNIT NUMBER, RESPECTIVELY,
751 *           ASSOCIATED WITH THE LOGICAL DEVICE INDEX LDI.
752 *
753 *           NOTE -  ONLY LMSECT TESTS FOR LEGAL LDI RANGE.
754 *
755             ENTRY       LMEQPC,LMDLOC,LMIFNM,LMLIMT,LMNEXT,LMSECT,LMUNIT
756 LMEQPC      BSS         1
757             SA1         X1              (X1) = LDI                          (FTN)
758             SB1         X1
759             SA1         ASTEQC-1+B1
760             BX6         X1              (X6) = ASTEQC(LDI)
761             EQ          LMEQPC
762 LMDLOC      BSS         1
763             SA1         X1              (X1) = LDI                          (FTN)
764             SB1         X1
765             SA1         ASTLOC-1+B1
766             BX6         X1              (X6) = ASTLOC(LDI)
767             EQ          LMDLOC
768 LMIFNM      BSS         1
769             SA1         X1              (X1) = LDI                          (FTN)
770             SB1         X1
771             SA1         ASTLFN-1+B1
772             RJ          LFNBF$          BLANKFILL LFN
773             EQ          LMIFNM
774 LMNEXT      BSS         1
775             SA1         X1              (X1) = LDI                          (FTN)
776             SB1         X1
777             SA1         ASTNXT-1+B1
778             BX6         X1              (X6) = ASTNXT(LDI)
779             EQ          LMNEXT
780 LMLIMT      BSS         1
781             SA1         X1              (X1) = LDI                          (FTN)
782             SB1         X1
```

```
                NOZL3D -        IOMFIP
783             SA1     ASTLIM-1+B1
784             BX6     X1              (X6) = ASTLIM(LDI)
785             EQ      LMLIMT
786   LMSECT    BSS     1
787   *         SA1     X1              (X1) = LDI                          (FTN)
788             SB6     MAXLDI          (B6) = LARGEST ALLOWED LDI
789             SB1     X1              (B1) = LDI
790             SX6     -1              (X6) = -1
791             LE      B1,LMSECT       RETURN (X6)=-1  IF LDI LE 0
792             GT      B1,B6,LMSECT    RETURN (X6)=-1  IF LDI GT 16
793             SA2     ASTEQC-1+B1     (X2) = ASTEQC(LDI)
794             SA3     ASTYPE-1+B1     (X3) = ASTYPE(LDI) = TYPEX+4
795             ZR      X2,LMSECT       RETURN (X6)=-1  IF LDI IS INACTIVE
796             MX0     -3              (X0) = 57-BIT MASK
797             BX3     -X0*X3          (X3) = TYPEX+4 IN RANGE (0,7)
798             SA1     ASTSEC+X3       (X1) = ASTSEC(TYPEX+5)
799             BX6     X1              (X6) = SECTOR SIZE
800             EQ      LMSECT          RETURN TO CALLING PROGRAM
801   LMUNIT    BSS     1
802             SA1     X1              (X1) = LDI                          (FTN)
803             SB1     X1
804             SA1     ASTUNT-1+B1
805             BX6     X1              (X6) = ASTUNT(LDI)
806             EQ      LMUNIT
807   *
808   NCOCTL$   SPACE   2
809   ***       NCOCTL$
810   *
811   *         TO CONVERT A 1-9 DIGIT POSITIVE INTEGER TO OCTAL
812   *         DISPLAY CODE FORMAT
813   *
814   *         COMPASS REFERENCE -
815   *
816   *         (X1) =    INTEGER TO BE ENCODED
817   *         RJ        NCOCTL$
818   *
819   *         THE RESULT RETURNS IN (X6)
820   *
821   *         REGISTERS USED&   A1,X1,X2,X3,X6
822   *         EXIT (B6)=2, (B7)=1
823   *
824             ENTRY     NCOCTL$
825   NCOCTL$   BSS       1               ENTRY/EXIT
826             MX2       -27D
827             SB6       B0              INITIALIZE BIT COUNTER
828             BX2       -X2*X1          LIMIT INTEGER TO 9 OCTAL DIGITS
829             MX3       -6              (X3) = RJ CHAR MASK
830             SA1       =10H          B
831             SB7       6               (B7) = 6
832   NCOCTL1    BSS       0
833             MX6       -3              (X6) = OCTAL DIGIT MASK
834             SB6       B6+B7           ADVANCE BIT COUNT BY 6
835             BX6       -X6*X2          ISOLATE OCTAL DIGIT IN (X6)
836             LX3       6               POSITION CHAR MASK
837             SX6       X6+1R0          OCTAL DIGIT TO DISPLAY CODE
838             BX1       X3*X1           CARVE CHAR WINDOW IN (X1)
839             LX6       B6,X6           ROTATE ENCODED DIGIT CHAR
840             AX2       3               ALIGN NEXT DIGIT OF SOURCE WORD
841             BX1       X1+X6           STUFF ENCODED DIGIT IN RESULT WORD
842             NZ        X2,NCOCTL1      CONTINUE IF SOURCE WORD IS NZ
843             SB7       1               RESTORE (B7) = 1
844             BX6       X1              PUT RESULT IN (X6)
845             SB6       B7+B7           RESTORE (B6) = 2
846             EQ        NCOCTL$         EXIT
847   RFNBF     SPACE     2
848   ***       RFNBF (RFN)
849   *
850   *         INJECT BLANKFILL IN A ZEROFILLED RIGHTJUSTIFIED FILENAME
851   *
852   *         FORTRAN REFERENCE -
853   *
854   *         RFNB =    RFNBF (RFN)
855   *         WHERE
856   *
857   *         RFN       ZERO-FILLED RIGHTJUSTIFIED CHAR STRING
858   *         RFNBF     SAME AS RFN, WITH 0-FILL REPLACED BY BLANKFILL
859   *
860   *         COMPASS REFERENCE -
861   *
862   *         (X1) =    LFN
863   *         RJ        RFNBF$
864   *
865   *         THE RESULT RETURNS IN (X6)
866   *         REGISTERS DESTROYED BY RFNBF$& B6,X1,X2,X3,X4,X6
867   *
868   *
869             ENTRY     RFNBF,RFNBF$
```

```
870  RFNBF$   BSS     1           COMPASS-CALLABLE ENTRY POINT
871           BX6     X1          INITIALIZE RESULT REGISTER
872           MX1     6           (X1) = LJ CHAR MASK
873           SX3     1R          (X3) = FILL CHAR
874           SB6     10          MAX CHARS IN STRING
875           SB7     1           (B7) = 1
876  RFNBF1    BSS     0
877            BX2     X1*X6      EXTRACT CHARACTER
878            LX1     54D        ROTATE MASK
879            NZ      X2,RFNBF$  EXIT ON NONZERO BYTE
880            LX3     54D
881            SB6     B6-B7      DECREMENT MAX CHAR COUNTER
882            BX6     X3+X6      INSERT BLANK CHARACTER
883            GT      B6,RFNBF1  CYCLE
884           EQ      RFNBF$      RETURN
885  RFNBF    BSS     1           FORTRAN CALLABLE ENTRY
886           SA1     X1          (X1) = LFN                    (FTN)
887           RJ      RFNBF$
888           EQ      RFNBF
889  *
890           END
```

```
            NOZL3D -        IOMPFM
 1  *DECK       IOMPFM
 2  * =DECK      IOMPFM      IOMPFM      ASSEMBLY
 3              IDENT     IOMPFM
 4              TITLE     PERMANENT FILE MANAGEMENT FUNCTIONS
 5  ASMCNTL     SPACE     3
 6  *CALL         IOMACTL
 7              IFEQ      OS,NOS          *
 8  ************************************                                  (NOS)
 9  *    EXTERNAL TEXT COMMON DECKS    *                                  (NOS)
10  ************************************                                  (NOS)
11  *           LIST      X               *                               (NOS)
12              XTEXT     COMCSYS         *  SYSTEM REQUEST ROUTINES      (NOS)
13              XTEXT     COMCPFM         *                               (NOS)
14              ENDIF                     *
15  ************************************
16  COMMON      SPACE     2
17  ***         COMMON BLOCK DECLARATION
18  *
19  * =PROCEDURE CDMASTA
20  *CALL          CDMASTA
21              USE       0
22  SUMMARY     SPACE     3
23  ***************************************************************************
24  *                                                                         *
25  *           PERMANENT FILE FUNCTIONS PROVIDE FOR RUNTIME EXECUTION        *
26  *           OF BASIC OPERATIONS PERTAINING TO THE ACTIVITY/STATUS         *
27  *           OF DATA FILES RESIDING ON PERMANENT DEVICES.                  *
28  *                                                                         *
29  *           PROGRAMMED BY C.A. FELIPPA, DEC 1975                          *
30  *                                                                         *
31  *           UPDATE -  NOV 1977                                            *
32  *                                                                         *
33  ***************************************************************************
34  *                                                                         *
35  *           A SUMMARY DESCRIPTION FOLLOWS.                                *
36  *                                                                         *
37  *           IOMAPF    ATTACH PERMANENT FILE TO JOB  (SCOPE/NOS)           *
38  *                                                                         *
39  *           IOMCPF    CATALOG PERMANENT FILE (SCOPE)                      *
40  *                                                                         *
41  *           IOMDPF    DEFINE DIRECT-ACCESS PERMANENT FILE (NOS)           *
42  *                                                                         *
43  *           IOMEPF    EXTEND PERMANENT FILE (SCOPE)                       *
44  *                                                                         *
45  *           IOMPPF    PURGES PERMANENT FILE (SCOPE/NOS)                   *
46  *                                                                         *
47  *           IOMRPF    REQUESTS EQUIPMENT APPROPRIATE AS RESIDENCE         *
48  *                     MEDIUM FOR A  PERMANENT FILE (SCOPE)                *
49  *                                                                         *
50  ***************************************************************************
51  IOMAPF      SPACE     2
52  ***         IOMAPF    (LFN, PFN, ID, MR)                          (SCOPE)
53  ***         IOMAPF    (LFN, PFN, UN, M)                            (NOS)
54  *
55  *           ENTRY POINT TO ATTACH A PERMANENT FILE TO RUN
56  *
57  *           FORTRAN REFERENCE (SCOPE) -
58  *
59  *           CALL   IOMAPF  (LFN, PFN, ID, M)
60  *
61  *           WHERE
62  *
63  *           LFN       LOGICAL FILENAME
64  *
65  *           PFN       42/PFN,6/0,6/RP,6/CY, AS IN IOMCPF.
66  *
67  *           ID        OPTIONAL OWNERS ID, AS IN IOMCPF.
68  *
69  *           M         FILE ACCESS MODE PARAMETER
70  *                      -1   MULTIREAD ACCESS (SAME AS MR=1 ON CC)
71  *                      +1   EXCLUSIVE ACCESS (SAME AS RW=0 ON CC)
72  *                       0   THIS ARGUMENT IS IGNORED
73  *
74  *           FORTRAN REFERENCE (NOS) -
75  *
76  *           CALL   IOMAPF  (LFN, PFN, UN, M)
77  *
78  *           WHERE
79  *
80  *           LFN,PFN   SAME AS ABOVE.  HOWEVER, RP AND CY FIELDS IN
81  *                     PFN WORD ARE IGNORED.
82  *
83  *           UN        OPTIONAL USERS NUMBER OR ID.  IF ZERO, THIS
84  *                     PARAMETER IS IGNORED.
85  *
86  *           M         FILE ACCESS MODE, AS IN IOMDPF.
```

```
                NOZL3D -        IOMPFM
 87  *
 88                  ENTRY     IOMAPF
 89  IOMAPF      BSS     1               ENTRY/EXIT POINT
 90  APFSYST     IFEQ    OS,SCOPE
 91                  SB5     -1              MARK ATTACH ENTRY               (SCOPE)
 92                  RJ      FDBSET          INITIALIZE FILE DEF BLOCK       (SCOPE)
 93                  SX7     11B                                               (SCOPE)
 94                  ZR      X4,ATTPF1                                         (SCOPE)
 95                  SX7     033B            SET EXCLUSIVE ACCESS            (SCOPE)
 96                  PL      X4,ATTPF1       TEST FOR M=1                    (SCOPE)
 97                  SX7     111B            SET MULTIREAD ACCESS FLAG       (SCOPE)
 98  ATTPF1      BSS     0                                                   (SCOPE)
 99                  SA7     A7+B7           STORE ACCESS MODE DESCRIPTOR    (SCOPE)
100  +           SA5     =7HATTACH,                                          (SCOPE)
101                  RJ      PFMESG          PRINT INFORMATIVE MESSAGE       (SCOPE)
102                  ATTACH  FDB,RC          ATTACH MACRO                    (SCOPE)
103  +           SA2     IOMAPF          FETCH RETURN INSTRUCTION        (SCOPE)
104                  EQ      PFMEXIT         GET RETURN CODE AND EXIT        (SCOPE)
105  APFSYST     ELSE
106                  SB5     -1              MARK ATTACH ENTRY                 (NOS)
107                  RJ      PFMFET          INITIALIZE FET FOR PFM REQUESTS   (NOS)
108                  MX6     0                                                 (NOS)
109                  BX7     X4              (X7) = M                          (NOS)
110                  SA6     UNW             CLEAR UN                          (NOS)
111                  SA7     AMW             STORE M                           (NOS)
112                  ZR      X3,ATTPF3                                         (NOS)
113                  BX6     X3                                                (NOS)
114                  BX1     X3              (X6) = UN                         (NOS)
115                  SA6     RJUNW                                             (NOS)
116                  SX1     A6                                                (NOS)
117                  RJ      =XLJRJN                                           (NOS)
118                  SA6     UNW                                               (NOS)
119                  SB1     RJUNW                                             (NOS)
120  ATTPF3      BSS     0                                                   (NOS)
121  +           SA5     =7HATTACH,                                          (NOS)
122                  RJ      PFMESG          PRINT INFORMATIVE MESSAGE       (NOS)
123                  ATTACH  FET,,UNW,,AMW   ATTACH MACRO                    (NOS)
124  +           SA2     IOMAPF          FETCH RETURN INSTRUCTION        (NOS)
125                  EQ      PFMEXIT         GET RETURN CODE AND EXIT        (NOS)
126  APFSYST     ENDIF
127  IOMCPF      SPACE   2
128  ***         IOMCPF  (LFN, PFN, ID, XR)                                  (SCOPE)
129  *
130  *           ENTRY POINT TO CATALOG A PERMANENT FILE (SCOPE ONLY)
131  *
132  *           FORTRAN REFERENCE -
133  *
134  *           CALL    IOMCPF  (LFN, PFN, ID, XR)
135  *
136  *           WHERE
137  *
138  *           LFN         LOGICAL FILENAME (1-7 ALPHANUMERIC CHARS,
139  *                       LEFTJUSTIFIED, ZEROFILLED). MUST BE
140  *                       CURRENTLY ATTACHED TO JOB.
141  *
142  *           PFN         42/PFN,6/0,6/RP,6/CY      WHERE
143  *                       PFN     PERMANENT FILENAME (SAME RESTRICTIONS
144  *                               AS FOR LFN)
145  *                       CY      CYCLE NUMBER (1-63). IF ZERO, THE O/S
146  *                               WILL ASSUME CY = (HIGHEST CAT CY) + 1
147  *                       RP      RETENTION PERIOD IN DAYS.  IF 0, THE
148  *                               PROGRAM ASSUMES RP=30 DAYS.
149  *
150  *           ID          OPTIONAL OWNERS ID (1 TO 7 CHARS, RJ WITH
151  *                       ZERO FILL).  IF ZERO, THIS SPEC IS IGNORED.
152  *
153  *           XR          IF NONZERO, PROGRAM ASSUMES THAT THIS IS A
154  *                       CONTROL/MODIFY/EXTEND PASSWORD (1-7 CHARS,
155  *                       RIGHTJUSTIFIED W/ZERO FILL). IGNORED IF ZERO
156  *
157                  ENTRY     IOMCPF
158  IOMCPF      BSS     1               ENTRY/EXIT POINT
159  CPFSYST     IFEQ    OS,SCOPE
160                  SB5     1               MARK CATALOG ENTRY              (SCOPE)
161                  RJ      FDBSET          INITIALIZE FILE DEF BLOCK       (SCOPE)
162                  SX2     13B             (X2) = CODE FOR XR DESCRIPTOR   (SCOPE)
163                  BX4     -X0*X4          (X4) = MASKED XR STRING         (SCOPE)
164                  LX4     6               ROTATE XR                       (SCOPE)
165                  ZR      X4,CATPF1       OMIT XR SPEC IF XR=0            (SCOPE)
166                  BX7     X4+X2           FORM DESCRIPTOR IN (X7)         (SCOPE)
167                  SA7     A7+B7           STORE XR SPEC                   (SCOPE)
168  CATPF1      BSS     0                                                   (SCOPE)
169  +           SA5     =9HCATALOG,                                         (SCOPE)
170                  RJ      PFMESG          PRINT INFORMATIVE MESSAGE       (SCOPE)
171                  CATALOG FDB,RC          CATALOG MACRO                   (SCOPE)
172  +           SA2     IOMCPF          FETCH RETURN INSTRUCTION        (SCOPE)
173                  EQ      PFMEXIT         GET RETURN CODE AND EXIT        (SCOPE)
```

```
                NOZL3D -        IOMPFM
174  CPFSYST    ELSE
175             EQ      IOMCPF                                          (NOS)
176  CPFSYST    ENDIF
177  IOMDPF     SPACE   2
178  ***        IOMDPF  (LFN, PFN, CT, M)                               (NOS)
179  *
180  *          ENTRY POINT TO DEFINE A (DIRECT ACCESS) PERMANENT FILE.
181  *          (NOS SYSTEM ONLY)
182  *
183  *          FORTRAN REFERENCE -
184  *
185  *          CALL    IOMDPF  (LFN, PFN, CT, M)
186  *
187  *          WHERE
188  *
189  *          LFN       LOGICAL FILENAME, AS IN IOMCPF.
190  *
191  *          PFN       42/PFN,6/0,6/RP,6/CY.  CY,RP ARE IGNORED UNDER NOS.
192  *
193  *          CT        FILE CATEGORY OCTAL VALUE (CF. NOS MANUAL)
194  *
195  *          M         FILE ACCESS MODE OR PERMISSION LEVEL
196  *                    OCTAL VALUE (CF. NOS MANUAL)
197  *
198             ENTRY     IOMDPF
199  IOMDPF     BSSZ      1               ENTRY/EXIT POINT
200  DPFSYST    IFEQ      OS,SCOPE
201             EQ        IOMDPF                                        (SCOPE)
202  DPFSYST    ELSE
203             SB5       1               MARK DEFINE ENTRY              (NOS)
204             RJ        PFMFET          INITIALIZE FET FOR PFM REQUESTS (NOS)
205             BX6       X3              (X6) = CT                      (NOS)
206             LX7       X4              (X7) = M                       (NOS)
207             SA6       CTW             STORE CT                       (NOS)
208             SA7       AMW             STORE M                        (NOS)
209  +          SA5       =7HDEFINE,      (X5) = OPERATION ID            (NOS)
210             RJ        PFMESG          PRINT INFORMATIVE MESSAGE      (NOS)
211             DEFINE    FET,,,,,CTW,AMW                                (NOS)
212  +          SA2       IOMDPF          FETCH RETURN INSTRUCTION       (NOS)
213             EQ        PFMEXIT         GET RETURN CODE AND EXIT       (NOS)
214  DPFSYST    ENDIF
215  *
216  IOMEPF     SPACE     2
217  ***        IOMEPF    (LFN, PFN, ID, O)
218  *
219  *          ENTRY POINT TO EXTEND A PERMANENT FILE  (SCOPE ONLY)
220  *
221  *          FORTRAN REFERENCE -
222  *
223  *          CALL    IOMEPF  (LFN, PFN, ID, O)
224  *
225  *          WHERE
226  *
227  *          LFN,PFN,ID     SAME AS FOR IOMCPF/IOMAPF
228  *
229             ENTRY     IOMEPF
230  IOMEPF     BSS       1               ENTRY/EXIT POINT
231  EPFSYST    IFEQ      OS,SCOPE
232             SB5       B0              MARK EXTEND/PURGE ENTRY        (SCOPE)
233             RJ        FDBSET          INITIALIZE FILE DEF BLOCK      (SCOPE)
234  +          SA5       =7HEXTEND,      (X5) = OPER ID                 (SCOPE)
235             RJ        PFMESG          PRINT INFORMATIVE MESSAGE      (SCOPE)
236             EXTEND    FDB,RC          EXTEND MACRO                   (SCOPE)
237             SA2       IOMEPF          FETCH RETURN INSTRUCTION       (SCOPE)
238             EQ        PFMEXIT         GET RETURN CODE AND EXIT       (SCOPE)
239  EPFSYST    ELSE
240             EQ        IOMEPF                                          (NOS)
241  EPFSYST    ENDIF
242  *
243  IOMPPF     SPACE     2
244  ***        IOMPPF    (LFN, PFN, ID, O)                             (SCOPE)
245  ***        IOMPPF    (LFN, PFN, UN, PW)                              (NOS)
246  *
247  *          ENTRY POINT TO PURGE AN ATTACHED PERMANENT FILE
248  *
249  *          FORTRAN REFERENCE (SCOPE) -
250  *
251  *          CALL    IOMPPF  (LFN, PFN, ID, O)
252  *
253  *          WHERE
254  *
255  *          LFN,PFN,ID     SAME AS FOR IOMCPF/IOMAPF
256  *                    LFN MUST BE CURRENTLY ATTACHED TO JOB.
257  *
258  *          FORTRAN REFERENCE (NOS) -
259  *          CALL    IOMPPF  (LFN, PFN, UN, O)
260  *
```

```
                NOZL3D -        IOMPFM
*               WHERE
*
*               LFN,PFN   SAME AS ABOVE
*               UN        USERS NUMBER
*
                ENTRY     IOMPPF
IOMPPF          BSS       1                 ENTRY/EXIT POINT
PPFSYST         IFEQ      OS,SCOPE
                SB5       B0                MARK EXTEND/PURGE ENTRY       (SCOPE)
                RJ        FDBSET            INITIALIZE FILE DEF BLOCK     (SCOPE)
+               SA5       =6HPURGE,         (X5) = OPER ID                (SCOPE)
                RJ        PFMESG            PRINT INFORMATIVE MESSAGE     (SCOPE)
                PURGE     FDB,RC            PURGE MACRO                   (SCOPE)
                SA2       IOMPPF            FETCH RETURN INSTRUCTION      (SCOPE)
                EQ        PFMEXIT           GET RETURN CODE AND EXIT      (SCOPE)
PPFSYST         ELSE
                RJ        PFMFET            INITIALIZE FET FOR PFM REQUESTS (NOS)
+               SA5       =6HPURGE,         (X5) = OPER ID                (NOS)
                RJ        PFMESG            PRINT INFORMATIVE MESSAGE     (NOS)
                PURGE     FET                                             (NOS)
                SA2       IOMPPF            FETCH RETURN INSTRUCTION      (NOS)
                EQ        PFMEXIT           GET RETURN CODE AND EXIT      (NOS)
PPFSYST         ENDIF
*
IOMRPF          SPACE     2
***             IOMRPF    (LFN)
*
*               ENTRY POINT TO REQUEST EQUIPMENT APPROPRIATE TO
*               PERMANENT FILE (SCOPE ONLY)
*
*               FORTRAN REFERENCE -
*
*               CALL   IOMRPF  (LFN)
*
*               WHERE LFN IS THE LOGICAL FILENAME OF THE PERM FILE.
*
                ENTRY     IOMRPF
IOMRPF          BSS       1
RPFSYST         IFEQ      OS,SCOPE
                SB7       1                                               (SCOPE)
                MX7       0                                               (SCOPE)
                SA1       X1                (X1) = LFN                    (SCOPE)
                SA7       FET+8             CLEAR FET(9)                  (SCOPE)
                MX0       42D                                             (SCOPE)
                SA7       A7-B7             CLEAR FET(8)                  (SCOPE)
                SB1       B0                                              (SCOPE)
                SA7       A7-B7             CLEAR FET(7)                  (SCOPE)
                SB2       B0                                              (SCOPE)
                SA7       A7-B7             CLEAR FET(6)                  (SCOPE)
                SA3       REQPFW            (X3) = *PF REQUEST WORD       (SCOPE)
                SA7       A7-B7             CLEAR FET(5)                  (SCOPE)
                SB3       B0                                              (SCOPE)
                SA7       A7-B7             CLEAR FET(4)                  (SCOPE)
                SA2       =3L*PF            (A2) = ADDRESS(DUMMY PFN)     (SCOPE)
                BX6       X0*X1             (X6) = MASKED LFN             (SCOPE)
                SA7       A7-B7             CLEAR FET(3)                  (SCOPE)
                BX7       X3                (X7) = FLAG WORD              (SCOPE)
                SA7       A7-B7             SET FET(2)                    (SCOPE)
                SA6       A7-B7             SET FET(1)                    (SCOPE)
                SA5       =8HREQUEST,       (X5) = OPERATION ID           (SCOPE)
                RJ        PFMESG                                          (SCOPE)
                REQUEST   FET               ISSUE REQUEST                 (SCOPE)
                SA2       IOMRPF            GET RETURN INSTRUCTION        (SCOPE)
                EQ        RPFEXIT           GET RETURN CODE AND EXIT      (SCOPE)
REQPFW          VFD       29/1,3/1,28/0              REQUEST,LFN,*PF      (SCOPE)
RPFSYST         ELSE
                EQ        IOMRPF                                          (NOS)
RPFSYST         ENDIF
FDBSET          SPACE     2
*
**              UTILITY CODE BLOCK TO INITIALIZE FILE DEFINITION BLOCK
*
*               ENTRY -   (B5) = FUNCTION FLAG&  1=CATALOG/DEFINE,
*                         -1=ATTACH, 0=EXTEND/PURGE.
*               EXIT -    (B7)=1, (B6)=2, LFN/PFN STORED,
*                         (A1)=ADDRESS(LFN), (A2)=ADDRESS(PFN),
*                         (A7) = ADDRESS OF LAST PARAMETER STORED,
*                         (X3) = VALUE OF 3RD ARGUMENT,
*                         (X4) = VALUE OF 4TH ARGUMENT,
*                         (B1)/(B2)/(B3)  ADRRESSES OF ID/CY/RP DESCR
*                         WORDS, RESP., IF IN FDB, ELSE ZERO,
*                         (X0) = 18-BIT MASK
*
FDBPFN          EQU       FET               PFN (SCOPE)
FDB             EQU       FET+4             LFN/RETURN-CODE/REQUEST-CODE (SCOPE)
PFMFET          BSS       0
FDBSET          BSS       1
```

```
                NOZL3D - 10MPFM
348  FDBSYST    IFEQ    OS,SCOPE
349             SA5     =555555555555550000B                    (SCOPE)
350             SB7     1               (B7) = 1                (SCOPE)
351             MX6     0               (X6) = 0                (SCOPE)
352             BX7     X5              (X7) = TERMINATOR WORD  (SCOPE)
353             SA6     FDB-1                                   (SCOPE)
354             SB6     B7+B7           (B6) = 2                (SCOPE)
355             SA7     A6+B6                                   (SCOPE)
356             SA6     A6-B7                                   (SCOPE)
357             SA7     A7+B7                                   (SCOPE)
358             SA6     A6-B7                                   (SCOPE)
359             SA7     A7+B7                                   (SCOPE)
360             MX0     42D             (X0) = FILENAME MASK    (SCOPE)
361             SA7     A7+B7                                   (SCOPE)
362             SA7     A7+B7                                   (SCOPE)
363             SA2     A1+B7                                     (FTN)
364             SA3     A1+B6                                     (FTN)
365             SA4     A2+B6                                     (FTN)
366             SA1     X1              (X1) = LFN                (FTN)
367             SA2     X2              (X2) = PFN                (FTN)
368             SA3     X3              (X3) = ID                 (FTN)
369             SA4     X4              (X4) = 4TH ARG VALUE      (FTN)
370             BX7     X0*X1           (X7) = MASKED LFN       (SCOPE)
371             BX6     X0*X2           (X6) = MASKED PFN       (SCOPE)
372             SA7     FDB             STORE LFN               (SCOPE)
373             SA6     A6-B7           STORE PFN               (SCOPE)
374             BX5     -X0*X2          (X5) = RP/CY FIELDS     (SCOPE)
375             MX0     -42D                                    (SCOPE)
376             SB1     B0              (B1) = 0                (SCOPE)
377             BX3     -X0*X3                                  (SCOPE)
378             SX7     14B             (X7) = CODE FOR ID-WORD (SCOPE)
379             LX3     6               ROTATE ID STRING        (SCOPE)
380             SA1     A7              (A1) = ADDRESS(LFN) IN FDB (SCOPE)
381             SA2     A6              (A2) = ADDRESS(PFN) IN FDB (SCOPE)
382             ZR      X3,FDBSET1      OMIT ID SPEC IF ID=0    (SCOPE)
383             BX7     X3+X7           INSERT ID CODE          (SCOPE)
384             SA7     A7+B7           STORE ID SPEC           (SCOPE)
385             SB1     A7              (B1) = ADDRESS(ID-DESCRIPTOR) (SCOPE)
386  FDBSET1    BSS     0                                       (SCOPE)
387             MX0     -6                                      (SCOPE)
388             BX7     -X0*X5          (X7) = CY FIELD         (SCOPE)
389             SB2     B0              (B2) = 0                (SCOPE)
390             LX7     6               POSITION CY VALUE       (SCOPE)
391             EQ      B5,FDBSET2      IGNORE CY ON EXTEND/PURGE (SCOPE)
392             ZR      X7,FDBSET2      OR IF CY = 0            (SCOPE)
393             SX7     X7+3            INSERT CY IDENTIFIER  (03B) (SCOPE)
394             SA7     A7+B7           STORE CYCLE DESCRIPTOR WORD (SCOPE)
395             SB2     A7              (B2) = ADDRESS(CY-DESCRIPTOR) (SCOPE)
396  FDBSET2    BSS     0                                       (SCOPE)
397             AX5     6               RIGHTJUSTIFY RP FIELD   (SCOPE)
398             BX7     -X0*X5          (X7) = RP               (SCOPE)
399             SB3     B0              (B3) = 0                (SCOPE)
400             LX7     6                                       (SCOPE)
401             LE      B5,FDBSET4      IGNORE RP EXCEPT FOR CATALOG (SCOPE)
402             NZ      X7,FDBSET3      TEST FOR NONZERO RP     (SCOPE)
403             SX7     36000           IF RP=0, SET RP = 30 DAYS (SCOPE)
404  FDBSET3    BSS     0                                       (SCOPE)
405             SX7     X7+2            INSERT RP IDENTIFIER (02B) (SCOPE)
406             SA7     A7+B7           STORE RP DESCRIPTOR     (SCOPE)
407             SB3     A7              (B3) = ADDRESS(RP-DESCRIPTOR) (SCOPE)
408  FDBSET4    BSS     0                                       (SCOPE)
409             MX0     -42D                                    (SCOPE)
410  FDBSYST    ELSE
411             MX6     0               (X6) = 0                  (NOS)
412             SB7     1               (B7) = 1                  (NOS)
413             MX7     0               (X7) = 0                  (NOS)
414             SB6     B7+B7           (B6) = 2                  (NOS)
415             SA6     FET+1           CLEAR FET(2)              (NOS)
416             SA7     A6+B7           CLEAR FET(3)              (NOS)
417             SA6     A6+B6           CLEAR FET(4)              (NOS)
418             SA7     A7+B6           CLEAR FET(5)              (NOS)
419             SA6     A6+B6           CLEAR FET(6)              (NOS)
420             SA7     A7+B6           CLEAR FET(7)              (NOS)
421             SA6     A6+B6           CLEAR FET(8)              (NOS)
422             MX0     42D                                       (NOS)
423             SA2     A1+B7                                     (FTN)
424             SA1     X1              (X1) = LFN                (FTN)
425             SA3     A2+B7                                     (FTN)
426             SA2     X2              (X2) = PFN                (FTN)
427             SA4     A3+B7                                     (FTN)
428             SA3     X3              (X3) = 3RD ARGUMENT       (FTN)
429             SA4     X4              (X4) = 4TH ARGUMENT       (FTN)
430             BX7     X0*X1           (X7) = MASKED LFN         (NOS)
431             BX6     X0*X2           (X6) = MASKED PFN         (NOS)
432             SX5     B7                                        (NOS)
433             SB1     B0              (B1) = 0                  (NOS)
434             BX7     X5+X7           SET FET ACTIVITY BIT ON   (NOS)
```

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                NOZL3D -        IOMPFM
435             SA1     FETW1                                           (NOS)
436             SA7     FET             STORE LFN                       (NOS)
437             SA6     FET+8           STORE PFN                       (NOS)
438             BX6     X1                                              (NOS)
439             SA6     A7+B7           STORE FET+1                     (NOS)
440             EQ      PFMFET          RETURN TO APPROPRIATE PROCEDURE (NOS)
441 FETW1       VFD     15/0,1/1,20/0,6/7,18/0     EP=1, FETLGTH=5+7    (NOS)
442 FDBSYST     ENDIF
443             EQ      FDBSET          RETURN TO APPROPRIATE ENTRY
444 PFMESG      SPACE   2
445 *
446 **          CODE BLOCK TO GENERATE AND PRINT INFORMATIVE MESSAGE
447 *
448 *           ENTRY REGISTER SET -
449 *           (A1)=ADDRESS(LFN), (A2)=ADDRESS(PFN)
450 *           (B1),(B2),(B3),(B7) -  SEE FDBSET
451 *           (X5) = OPERATION ID TEXT.
452 *           EXIT -    (B1)=1, ALL OTHERS DESTROYED.
453 *
454 PFMESG      BSS     1
455             SA4     =6H0++-
456             IFEQ    OS,SCOPE
457             SA1     A1              (X1) = LFN                      (SCOPE)
458             ELSE
459             SA1     FET             (X1) = LFN                       (NOS)
460             ENDIF
461             LX7     X5
462             BX6     X4
463             SA7     ASTMSG+1        OPERATION ID TO ASTMSG(2)
464             SA6     A7-B7           INITIALIZE ASTMSG(1)
465             SX4     1R,
466             RJ      =XLFNBF$        BLANKFILL LFN IN (X6)
467             MX0     6
468             LX4     12D
469             LX0     18D
470             BX7     -X0*X6
471             IFEQ    OS,SCOPE
472             SA1     A2              (X1) = PFN                      (SCOPE)
473             ELSE
474             SA1     FET+8           (X1) = PFN                       (NOS)
475             ENDIF
476             BX7     X4+X7           INSERT COMMA AFTER LFN
477             RJ      =XLFNBF$        BLANKFILL PFN IN (X6)
478             SA7     A7+B7           STORE LFN IN ASTMSG(3)
479             BX7     X6              (X7) = PFN
480             MX0     -6
481             SA7     A7+B7           STORE PFN IN ASTMSG(4)
482             EQ      B1,PFMSG1       SKIP IF NO ID STORED
483             SX4     1R*
484             SA1     B1              (X1) = ID DESCRIPTOR WORD
485             RJ      =XRFNBF$        BLANKFILL PFN-ID IN (X6)
486             MX0     -6
487             BX6     X0*X6           CLEAR SLOT FOR *
488             BX6     X6+X4           INSERT ASTERISK
489             SA6     A7              STORE PFN-ID IN ASTMSG(4)
490             SA7     A7+B7           STORE PFN INTO  ASTMSG(5)
491 PFMSG1      BSS     0
492             IFEQ    OS,SCOPE
493             EQ      B2,PFMSG2       OMIT CY PRINT IF (B2)=0
494             SA1     B2              (X1) = CY DESCRIPTOR WORD
495             AX1     6               RIGHTJUSTIFY CYCLE NO.
496             SA5     =7L,  CY=
497             RJ      =XNCOCTL$       CONVERT TO DISPLAY CODE IN (X6)
498             MX0     -18D
499             BX6     -X0*X6
500             BX7     X5+X6           (X7) NOW HAS 10H,  CY = XXB
501             SA7     A7+B7           STORE CY LABEL WORD
502 PFMSG2      BSS     0
503             EQ      B3,PFMSG3       OMIT RP PRINT IF (B3)=0
504             SA1     B3              (X1) = RP DESCRIPTOR WORD
505             AX1     6               RIGHTJUSTIFY RP VALUE
506             SA5     =7L,  RP=
507             RJ      =XNCOCTL$       CONVERT TO DISPLAY CODE IN (X6)
508             MX0     -18D
509             BX6     -X0*X6
510             BX7     X5+X6           (X7) NOW HAS 10H,  RP = XXB
511             SA7     A7+B7           STORE RP LABEL WORD
512 PFMSG3      BSS     0
513             ENDIF
514             RJ      =XIOMESSG       PRINT MESSAGE
515             SB1     1               SET (B1) = 1
516             EQ      PFMESG          RETURN TO APPROPRIATE MACRO
517 *
518 *
519 **          UTILITY CODE BLOCK FOR TERMINATION ACTIVITIES
520 *
521 *           ENTRY -   (X2) = RETURN INSTRUCTION
```

```
522  *
523  RPFEXIT  BSS     0
524           SA5     FET
525           EQ      PFMEXIT+1
526  PFMEXIT  BSS     0
527           IFEQ    OS,SCOPE
528           SA5     FDB             FETCH BASE WORD                 (SCOPE)
529           ELSE
530           SA5     FET             FETCH BASE WORD                   (NOS)
531           ENDIF
532  +        BX7     X2
533           MX0     -9D
534           SA7     PFMRET          STORE RETURN
535           AX5     9D
536           BX6     -X0*X5          ISOLATE RETURN CODE
537           SA6     STATUS          PLACE RC IN STATUS WORD
538           ZR      X6,PFMRET       RETURN IF RC = 0
539           SA5     =10HFAC STATUS
540           LX1     X6
541           BX7     X5
542           SA7     ASTMSG+1
543           RJ      =XNCOCTL$       ENCODE STATUS IN (X6)
544           SA6     ASTMSG+2        STORE IT
545           RJ      =XIOMESSG       PRINT STATUS MESSAGE
546  PFMRET   BSS     1               RETURN TO CALLING PROGRAM
547  *
548           IFEQ    OS,NOS
549  CTW      BSSZ    1               FILE CATEGORY WORD              (NOS)
550  UNW      BSSZ    1               USERS NUMBER WORD               (NOS)
551  RJUNW    BSSZ    1                                               (NOS)
552  AMW      BSSZ    1               ACCESS MODE WORD                (NOS)
553           ENDIF
554           END
```

```
          NOZL3D -       IOMPRT
 1  *DECK       IOMPRT
 2  C=DECK      IOMPRT      IOMPRT      SUBROUTINE
 3        SUBROUTINE    IOM PRT
 4  C
 5  C=PURPOSE   COLLECTION OF DISPLAY PROCEDURES SUPPORTING DMGASP/CDC
 6  C=AUTHOR    C. A. FELIPPA
 7  C=VERSION   JUNE 1977
 8  C=EQUIPMENT CDC
 9  C=KEYWORDS  AUXILIARY   STORAGE     MANAGER     I/O         DATA
10  C=KEYWORDS  PRINT       DISPLAY     OUTPUT
11  C=EASY-SUB  LFNBF
12  C
13  C
14  C                   C O M M O N
15  C
16  C=PROCEDURE IOMCOM      CDMERR      CDMETS
17  *CALL               IOMCOM
18  *CALL               DMECOM
19        COMMON /CDMPAD/
20       $    CMSIZ,     BCSIZ,     REQCM,     LWAREC,    PAD(192)
21        INTEGER        CMSIZ,     BCSIZ,     REQCM,     PAD
22  C
23  C                   T Y P E   A N D   D I M E N S I O N
24  C
25        INTEGER        DEVDAT(12),EQCODE,  FET(12)
26        INTEGER        ERRMSG(2,12)
27        INTEGER        PFNDAT(3),TABFMT(7)
28  C
29  C                   E Q U I V A L E N C E
30  C
31        EQUIVALENCE    (FET,ASTPKT(14))
32        EQUIVALENCE    (DEVDAT,PAD(65)), (PFNDAT,PAD(77)), (TABFMT,PAD(81))
33        EQUIVALENCE    (IOERCD,ASTOSD(2))
34        EQUIVALENCE    (LDIX,DEVDAT(1)), (EQCODE,DEVDAT(3))
35  C
36  C                   D A T A
37  C
38        DATA           ASTOSD(1) /1H /
39        DATA           ASTMSG /6H0+++  ,8*1H /
40        DATA           ERRMSG /2*1H ,    10HILLEGAL DE,10HVICE INDEX,
41       $     10HINACTIVE D,10HEVICE REF ,10HFILE AINT ,10HATTACHED  ,
42       $     10HILLEGAL TA,10HPE POSTION,10HILLEGAL MS,10H POSITION ,
43       $     10HILLEGAL RE,10HCORD SIZE ,10HILLEGAL RE,10HAD REQUEST,
44       $     10HDEVICE OVE,10HRFLOW     ,10HILLEGAL WR,10HITE REQUST,
45       $     10HMISCELL. I,10H/O ERROR  ,10HO/S CANT H,10HONOR REQST /
46  C
47  C                   L O G I C
48  C
49  C=ENTRY     IOMOSD      IOMOSD      ENTRY
50  C=PURPOSE   PRINT OPERATION STATUS DESCRIPTORS (OSD)
51  C=USAGE     INTERNAL USE BY DMGASP/CDC
52  C
53  C     ++++++++++++++++++++
54        ENTRY          IOM OSD
55  C     ++++++++++++++++++++
56  C
57        PRINT 10,      ASTOSD(1),ASTOSD(2),ERRMSG(1,IOERCD+1),
58       $               ERRMSG(2,IOERCD+1),(ASTOSD(J),J=3,14)
59     10 FORMAT (16H0+++  LAST OP = A6,13H,  ERROR CODE14/6X2A10/6X,73HDEVI
60       $CE  TYPEX LCARG1 LCARG2 LOCDEV SIZREC RET/EOI STATUS DTERR/RSC NWR
61       $DXF  /5X417,1X06,I7,1X03,I4,5X02,4X02,2X02,I7)
62        RETURN
63  C
64  C=ENTRY     IOMFET      IOMFET      ENTRY
65  C=PURPOSE   PRINT FILE ENVIRONMENT TABLE (FET) AREA
66  C=USAGE     INTERNAL USE BY DMGASP/CDC
67  C
68  C     ++++++++++++++++++++
69        ENTRY          IOM FET
70  C     ++++++++++++++++++++
71  C
72        LFNAME =   LFNBF(FET)
73        PRINT 12,      LFNAME,(FET(J),J=1,10)
74     12 FORMAT (/22H +++  F.E.T. OF FILE  ,A7/
75       A   6X,7HFET+0 = 021,10X,7HFET+1 = 021 / 6X,7HFET+2 = 021,
76       B  10X,7HFET+3 = 021 / 6X,7HFET+4 = 021,10X,7HFET+5 = 021/
77       C   6X,7HFET+6 = 021,10X,7HFET+7 = 021 / 6X,7HFET+8 = 021,
78       D  10X,7HFETEXT= 021 )
79        RETURN
80        ENTRY          IOMFETX
81        PRINT 13,      (J,ASTPKT(J),J=1,12)
82     13 FORMAT (/(6X,7HASTPKT(I2,3H)= O6,6X,7HASTPKT(I2,3H)= O6,6X,
83       $    7HASTPKT(I2,3H)= O6,6X,7HASTPKT(I2,3H)= O6))
84        RETURN
85  C
86  C=ENTRY     IOMTAB      IOMTAB      ENTRY
```

```
            NOZL3D -        IOMPRT
 87  C=PURPOSE   PRINT AUXILIARY STORAGE TABLE (AST)
 88  C=USAGE     INTERNAL USE BY DMGASP/CDC
 89  C
 90  C     ++++++++++++++++++++
 91        ENTRY          IOM TAB
 92  C     ++++++++++++++++++++
 93  C
 94        PRINT 14
 95     14 FORMAT (/1X,71(1H+) /2H +11X, 47HA U X I L I A R Y    S T O R A G E
 96       $E    T A B L E,11X,1H+/1X,71(1H+)/1X,1H+69X1H+/72H + LDI  LFN
 97       $ EQC TYP OPT SEC  CDLOC   NEXT  LIMIT     READ WRITTEN +)
 98        ASTCNT(1) =  0
 99        ASTCNT(2) =  0
100        DO 1800  J = 1,ASTDIM
101          LDIX =     J
102          EQCODE =   ASTEQC(J)
103          IF (EQCODE .EQ. 0)              GO TO 1800
104          CALL           IOM LDIX
105          PRINT TABFMT,          DEVDAT
106          IF (PFNDAT(1) .NE. 0)           PRINT 16, PFNDAT
107   1800   CONTINUE
108     16 FORMAT (8H + (PFN= A7,5H, CY=I2,6H, ID= R8,1H),34X,1H+)
109  C
110        PRINT 18,      ASTCNT
111     18 FORMAT (2H +69X1H+ /2H + I21,17H ACTIVE DEVICES (I2,6H FULL)
112       A 23X 1H+/2H + I6, 8H TP-OPS, I6,8H WRITES, I6,7H READS,
113       B I8,1H/I8,12H WORDS XFD + /1X 71(1H+) /)
114        RETURN
115  C
116  C=ENTRY     IOMESS      IOMESS      ENTRY
117  C=PURPOSE   PRINT ASTMSG (MESSAGE) ARRAY
118  C=USAGE     INTERNAL USE BY DMGASP/CDC AND SUBPROCESSORS
119  C
120  C     ++++++++++++++++++++
121        ENTRY          IOMESSG
122  C     ++++++++++++++++++++
123  C
124  C
125        PRINT 25,       (ASTMSG(J),J=1,7)
126     25 FORMAT (A6,6A10)
127        ASTMSG(1) = 6H +++
128        ASTMSG(2) = 1H
129        ASTMSG(3) = 1H
130        ASTMSG(4) = 1H
131        ASTMSG(5) = 1H
132        ASTMSG(6) = 1H
133        ASTMSG(7) = 1H
134        RETURN
135  C
136  C=ENTRY     PADPRT      PADPRT      ENTRY
137  C=PURPOSE   DISPLAY CONTENTS OF CDMPAD COMMON BLOCK
138  C=USAGE     FOR DMGASP DEBUG PRINT ONLY
139  C
140  C     ++++++++++++++++++++
141        ENTRY          PADPRT
142  C     ++++++++++++++++++++
143  C
144        PRINT 32,      CMSIZ,BCSIZ,REQCM,LWAREC, (PAD(J),J=1,64)
145     32 FORMAT (/6X,8HCMSIZ = 06,10H, BCSIZ = 06,10H, REQCM = 06,
146       $ 11H, LWAREC = 06, 17H, PAD/SAVE AREA&  /(2X,6021))
147   5000 CONTINUE
148        RETURN
149        END
```

APPENDIX B
LISTING OF THE NOZLIC PROGRAM

NOZLIC - COMDECKS

```
1   *COMDECK COM1
2         COMMON/C1/Q(32,16,32)
3         COMMON /C3/ ALP,RE,FSMACH,GAMMA,JMAX,KMAX,LMAX,JWMAX,LWF,ND,LE,FN
4        1,NOPT,JT,ETAE,ITMAX,LMAXBC,LIBC,SMU,DT,PR,TW,KREADY,IRGRID,ICRUDE,
5        2  ITOT,INWALL,LW,KW,JREADX,IWRIT,JLW,JKW,KLW,FSP,FST,JL1WL,JL1WU,
6        3  KMAXBC,JK1WU,JK1WL
7         COMMON/C4/IGEOM,XMAX,XZERO,YMAX,X1,X2,X3,X4,Z1,Z2,Z3,Z4,ZT,RT
8         COMMON /C5/EMC(32),UC(32),PC(32),TC(32),UE(32),DELT(32),DELTZ(32)
9         COMMON /C6/RI(32),PTI(32),HTI(32),VROUI(32),PTOT(32,32),
10        1  HTOT(32,32),VOU(32,32),WOU(32,32),RL(32)
11        COMMON/C7/YKR(32),TH(32),X(32)
12        COMMON/C8/XX(32,3)
13        COMMON/10/NLROW,NKLP,NLSKIP
14  C     LEVEL 2,Q,X,Y,Z
```

```
      *DECK CRUDIC
            SUBROUTINE CRUDIC
      *CALL COM1
            DIMENSION QSAVE(32,5,32)
            EMC2(B)=1.+FLOAT(IJ)*B**.5
            FUNC(A)=4.*EMC2(A)*(1.+(GAMMA-1.)/2.*EMC2(A))
             IF(NOPT.EQ.3) GO TO 60
      C
      C     NOPT=2
      C
            CALL LKPGAS(JMAX,2)
            XMAX=Q(1,6,1)
            LW1=LW+1
            DO 50 J=1,JMAX
            CALL LKPGAS(J,2)
            DO 42 K=1,KMAX
      C
      C   SET UP INITIAL CONDITIONS AT INFLOW PLANE J=1
      C
            IF(J.GT.1) GO TO 20
      C
      C     INSIDE OF THE NOZZLE FOR NOPT =2 WE WILL USE INITQ RESULTS
      C
      C     OUTSIDE OF THE NOZZLE
      C
      C
            DO 10 L=LW1,LMAX
            PCTOT=(FSP/PTOT(L,K))**((GAMMA-1.)/GAMMA)
            VLS=2.*HTOT(L,K)*(1.-PCTOT)/(GAMMA-1.)
            VL=SQRT(VLS)
            Q(L,1,K)=PTOT(L,K)/HTOT(L,K)*(FSP/PTOT(L,K))**(1.0/GAMMA)
            Q(L,2,K)=Q(L,1,K)*VL/SQRT(1.+VOU(L,K)**2+WOU(L,K)**2)
            Q(L,3,K)=Q(L,2,K)*VOU(L,K)
            Q(L,4,K)=Q(L,2,K)*WOU(L,K)
            T=HTOT(L,K)*PCTOT
            Q(L,5,K)=Q(L,1,K)*(T/(GAMMA*(GAMMA-1.))+VLS/2.)
         10 CONTINUE
            DO 15 L=LW1,LMAX
            DO 15 N=1,5
            QSAVE(L,N,K)=Q(L,N,K)
         15 CONTINUE
         20 CONTINUE
      C
      C     SET UP INITIAL CONDITIONS IN PLANES J > 0
      C
            IF (J.EQ.1) GO TO 40
      C
      C     OUTSIDE THE NOZZLE L > LW  (REGION 1 AND 2)
      C
            DO 35 L=LW1,LMAX
            IF (L.EQ.LMAX) GO TO 30
            DO 25 N=1,5
         25 Q(L,N,K)=QSAVE(L,N,K)
            GO TO 35
      C
      C     FREESTREAM BOUNDARY L=LMAX
      C
         30 Q(L,1,K)=FSP/FST
            Q(L,2,K)=Q(L,1,K)*(FSMACH*SQRT(FST))
            Q(L,3,K)=0.
            Q(L,4,K)=0.
            Q(L,5,K)=FSP*(1./(GAMMA*(GAMMA-1.))+.5*FSMACH**2)
         35 CONTINUE
         40 CONTINUE
      C     BEYOND THE END OF THE NOZZLE AND INSIDE THE NOZZLE L=1,LW
      C     REGION 3 AND 4
      C    INSIDE NOZZLE FOR NOPT=2 WE WILL USE INITQ RESULTS
         42 CONTINUE
      C     ENSURE VELOCITIES = 0 AT WALLS
            IF(LW.EQ.0) GO TO 46
            DO 45 L=LW,LW1
            DO 45 K=1,KMAX
            Q(L,2,K)=0.
            Q(L,3,K)=0.
            Q(L,4,K)=0.
            IF (L.EQ.LW) GO TO 45
            Q(L,1,K)=PTOT(L,K)/HTOT(L,K)
            Q(L,5,K)=PTOT(L,K)/(GAMMA*(GAMMA-1.))
         45 CONTINUE
         46 CONTINUE
            CALL LKPGAS(J,1)
         50 CONTINUE
            GO TO 999
         60 CONTINUE
      C
      C     NOPT=3
```

```
C
      JKLW=MIN0(JKW,JLW)
      IF(KW.EQ.0) KMW=KMAX
      IF(KW.NE.0) KMW=KW
      IF(LW.EQ.0) LMW=LMAX
      IF(LW.NE.0) LMW=LW
      CALL XYZXI(KMAX,JMAX,LMAX)
C
C  CALCULATE LOCAL STATIC PRESSURE
C
      T0=1.0
      P0=1.0
      DO 65 I=1,2
      IF(JT.EQ.JMAX.AND.I.EQ.1) GO TO 65
      IF(I.EQ.1) IJ=+1
      IF(I.EQ.2) IJ=-1
      J=JT
      CALL LKPGAS(J,2)
      PHIJ=0.
      XXX=Q(1,6,1)
      CALL GEOM(XXX,AJ,ZZT)
      EMC(J)=1.
   63 TC(J)=T0/(1.+(GAMMA-1.)/2.*EMC(J)**2)
      PC(J)=P0*TC(J)**(GAMMA/(GAMMA-1.))
      IF(J.EQ.JMAX) GO TO 65
      IF(J.EQ.1) GO TO 65
      J=J+IJ
      AB=AJ
      CALL LKPGAS(J,2)
      XXX=Q(1,6,1)
      CALL GEOM(XXX,AJ,ZZT)
      DELPSI=ALOG(AJ/AB)
      PHIHAT=PHIJ+DELPSI*FUNC(PHIJ)
      PHIJ=.5*(PHIJ+PHIHAT+DELPSI*FUNC(PHIHAT))
      EMC(J)=EMC2(PHIJ)**.5
      GO TO 63
   65 CONTINUE
      DO 100 J=1,JMAX
      CALL LKPGAS(J,2)
      DO 70 K=1,KMAX
      DO 70 L=1,LMAX
      P=FSP
      IF(K.LE.KW.AND.L.LE.LW.AND.J.LT.JKLW) P=PC(J)
      CALL QCALC(J,K,L,HTOT(L,K),PTOT(L,K),P)
   70 CONTINUE
C
C     ZERO VELOCITY AT ALL WALLS
C
      IF(J.LT.JKLW) GO TO 80
      IF(J.GT.JKW) GO TO 75
      DO 72 L=1,LW+1
      DO 72 K=KW,KW+1
      P=FSP
      CALL QZERO(J,K,L,HTOT(L,K),PTOT(L,K),P)
   72 CONTINUE
   75 IF(J.GT.JLW) GO TO 90
      DO 77 K=1,KW+1
      DO 77 L=LW,LW+1
      P=FSP
      CALL QZERO(J,K,L,HTOT(L,K),PTOT(L,K),P)
   77 CONTINUE
      GO TO 90
   80 IF(KW.EQ.0) GO TO 86
      DO 85 K=KW,KW+1
      IF(K.EQ.KW) P=PC(J)
      IF(K.EQ.KW+1) P=FSP
      IF(K.EQ.KW) LS=LW
      IF(K.EQ.KW+1) LS=LW+1
      IF(LW.EQ.0) LS=LMAX
      DO 85 L=1,LS
      CALL QZERO(J,K,L,HTOT(L,K),PTOT(L,K),P)
   85 CONTINUE
   86 IF(LW.EQ.0) GO TO 90
      DO 87 L=LW,LW+1
      IF(L.EQ.LW) P=PC(J)
      IF(L.EQ.LW+1) P=FSP
      IF(L.EQ.LW) KS=KW
      IF(L.EQ.LW+1) KS=KW+1
      IF(KW.EQ.0) KS=KMAX
      DO 87 K=1,KS
      CALL QZERO(J,K,L,HTOT(L,K),PTOT(L,K),P)
   87 CONTINUE
   90 IF(J.LT.JL1WL) GO TO 95
      IF(J.GT.JL1WU) GO TO 95
C
C   WEDGE PLUG AT L=1
C
```

```
                NOZLIC - CRUDIC
174         DO 92 K=1,KMW
175         L=1
176         IF(J.GE.JKLW) P=FSP
177         IF(J.LT.JKLW) P=PC(J)
178         CALL QZERO(J,K,L,HTOT(L,K),PTOT(L,K),P)
179      92 CONTINUE
180      95 CONTINUE
181         IF(JK1WU.EQ.0) GO TO 99
182         IF(J.LT.JK1WL) GO TO 99
183         IF(J.GT.JK1WU) GO TO 99
184   C
185   C     WEDGE PLUG AT K=1
186   C
187         DO 97 L=1,LMW
188         K=1
189         IF(J.LT.JKLW) P=PC(J)
190         IF(J.GE.JKLW) P=FSP
191         CALL QZERO(J,K,L,HTOT(L,K),PTOT(L,K),P)
192      97 CONTINUE
193      99 CALL LKPGAS(J,1)
194   C
195     100 CONTINUE
196     999 RETURN
197         END
```

NOZLIC - DELI

```
1  *DECK DELI
2        FUNCTION DELI(X)
3        DELI=.025*RWFUNC(X)
4        RETURN
5        END
```

NOZLIC - DELOUT

```
1  *DECK DELOUT
2        FUNCTION DELOUT(X)
3        DELOUT=.01*(RMAX(X)-RWOUT(X))
4        RETURN
5        END
```

```
 1  *DECK DKMET
 2        SUBROUTINE DKMET(J,K,L,XK,YK,ZK)
 3  *CALL COM1
 4  C     INTERMEDIATE WALL IN K DIRECTION
 5        IF(KPLANE.EQ.0) GO TO 100
 6        XK=0.0
 7        YK=1.0
 8        ZK=0.0
 9        RETURN
10    100 DY2 = .5
11        KP = K+1
12        KR = K-1
13        IF(KW.LE.0.OR.K.LT.KW.OR.K.GT.KW+1.OR.J.GT.JKW) GO TO 200
14        IF(LW.GT.0.AND.L.GT.LW) GO TO 200
15        IF(K.EQ.KW) GO TO 700
16        IF(K.EQ.KW+1) GO TO 500
17    200 IF(K.NE.1) GO TO 600
18  C     TEST FOR INTERMEDIATE WALL NORMAL TO K=1 SURFACE
19        IF(LW) 300,300,450
20    300 IF(JKIWL.LE.J.AND.J.LE.JKIWU) GO TO 500
21  C     SYMMETRY
22    400 XK=0.0
23        ZK=0.0
24        YK=2.0*(Q(L,7,KP)-Q(L,7,K))*DY2
25        RETURN
26  C     TEST FOR WALL NORMAL TO K=1 SURFACE
27    450 IF(L-LW) 300,300,400
28  C     FORWARD DIFFERENCE
29    500 FAC=2.0
30        KR=K
31        GO TO 900
32    600 IF(K.NE.KMAX) GO TO 800
33        IF(KMAXBC.LT.3.OR.KMAXBC.GT.4) GO TO 700
34  C     SYMMETRY
35        XK=0.0
36        YK=0.0
37        ZK=0.0
38        IF(KMAXBC.EQ.3) YK=2.0*(Q(L,7,K)-Q(L,7,KR))*DY2
39        IF(KMAXBC.EQ.4) ZK=2.0*(Q(L,8,K)-Q(L,8,KR))*DY2
40        RETURN
41  C     BACKWARD DIFFERENCE
42    700 KP=K
43        FAC=2.0
44        GO TO 900
45  C     CENTRAL DIFFERENCE
46    800 FAC=1.0
47    900 XK=0.
48        YK=(Q(L,7,KP)-Q(L,7,KR))*DY2*FAC
49        ZK=(Q(L,8,KP)-Q(L,8,KR))*DY2*FAC
50        RETURN
51        END
```

```
1  *DECK DLMET
2        SUBROUTINE DLMET(J,K,L,XL,YL,ZL)
3  *CALL COM1
4  C     INTERMEDIATE WALL IN L DIRECTION
5        DZ2 = .5
6        LP = L+1
7        LR = L-1
8        IF(LW.LE.0.OR.L.LT.LW.OR.L.GT.LW+1.OR.J.GT.JLW) GO TO 100
9        IF(KW.GT.0.AND.K.GT.KW) GO TO 100
10       IF(L.EQ.LW) GO TO 700
11       IF(L.EQ.LW+1) GO TO 500
12   100 IF(L.NE.1) GO TO 600
13 C     AXIS OF SYMMETRY
14       IF(LAXIS.NE.1) GO TO 150
15       XL=0.0
16       YL=Q(LP,7,K)-Q(L,7,K)
17       ZL=Q(LP,8,K)-Q(L,8,K)
18       GO TO 999
19 C     TEST FOR INTERMEDIATE WALL NORMAL TO L=1 SURFACE
20   150 IF(KW) 200,200,400
21 C     TEST FOR WALL AT L=1
22   200 IF(JL1WL.LE.J.AND.J.LE.JL1WU) GO TO 500
23 C     SYMMETRY
24   300 XL=0.0
25       YL=0.0
26       ZL=2.0*(Q(LP,8,K)-Q(L,8,K))*DZ2
27       GO TO 999
28 C     TEST FOR WALL AT L=1
29   400 IF(K-KW) 200,200,300
30 C     FORWARD DIFFERENCE
31   500 LR=L
32       FAC=2.0
33       GO TO 900
34   600 IF(L.NE.LMAX) GO TO 800
35       IF(LMAXBC.LT.3.OR.LMAXBC.GT.4) GO TO 700
36 C     SYMMETRY
37       XL=0.0
38       YL=0.0
39       ZL=0.0
40       IF(LMAXBC.EQ.3) YL=2.0*(Q(L,7,K)-Q(LR,7,K))*DZ2
41       IF(LMAXBC.EQ.4) ZL=2.0*(Q(L,8,K)-Q(LR,8,K))*DZ2
42       GO TO 999
43 C     BACKWARD DIFFERENCE
44   700 LP=L
45       FAC=2.0
46       GO TO 900
47 C     CENTRAL DIFFERENCE
48   800 FAC=1.0
49   900 XL=0.
50       YL=(Q(LP,7,K)-Q(LR,7,K))*DZ2*FAC
51       ZL=(Q(LP,8,K)-Q(LR,8,K))*DZ2*FAC
52   999 RETURN
53       END
```

```
 1  *DECK GEOM
 2        SUBROUTINE GEOM(XIN,A,ZIN)
 3  *CALL COM1
 4        DIMENSION AR(32),B(32)
 5        DATA PI2/1.57079632/
 6        DATA IFIRST/0/
 7        ZFUNC(XXX)=ZT+XXX*XXX/(RT+(RT*RT-XXX*XXX)**.5)
 8        IF (NOPT.EQ.2) GO TO 70
 9        IF (NOPT.EQ.3) GO TO 80
10        IF (IGEOM.EQ.2) GO TO 25
11  C     2D COSINE NOZZLE
12        XT=0.
13        ZI=2.0
14        ZE=1.5
15        ZT=1.0
16  C     NOZZLE HEIGHT Z AND AREA A AT STATION X RELATIVE TO THROAT XT
17        IF (XIN-XT) 10,10,15
18     10 ZIN=ZT+.5*(ZI-ZT)*(1.+COS(PI2*(XIN-XZERO)))
19        GO TO 20
20     15 ZIN=ZT+.5*(ZE-ZT)*(1.+COS(PI2*(XMAX-XIN)))
21  C     2D NOZZLE AREA
22     20 A=ZIN
23        GO TO 95
24     25 CONTINUE
25        IF (IFIRST.NE.0) GO TO 30
26        ZT=.5388
27        RT=1.0777
28        X1=-2.275
29        X2=-.4095
30        X3=.0228
31        X4=2.275
32        Z1=1.3859
33        Z2=ZFUNC(X2)
34        Z3=ZFUNC(X3)
35        Z4=.5868
36        IFIRST=1
37     30 CONTINUE
38        IF (XIN-X1) 35,35,40
39     35 ZIN=Z1
40        GO TO 65
41     40 IF (XIN-X2) 45,45,50
42     45 ZIN=Z1+((Z2-Z1)/(X2-X1))*(XIN-X1)
43        GO TO 65
44     50 IF (XIN-X3) 55,55,60
45     55 ZIN=ZFUNC(XIN)
46        GO TO 65
47     60 ZIN=Z3+((Z4-Z3)/(X4-X3))*(XIN-X3)
48     65 A=ZIN*YMAX
49        GO TO 95
50  C
51  C     NOPT=2
52  C
53     70 A=PI2/2.*RWFUNC(XIN)**2
54        GO TO 95
55  C
56  C     NOPT=3
57  C
58     80 KT=KMAX
59        IF(KW.GT.0) KT=KW
60        LT=LMAX
61        IF(LW.GT.0) LT=LW
62        DO 85 L=1,LT
63        CALL XXM(L,J,1,KT)
64        DO 83 K=1,KT
65        DA=SQRT(XX(K,1)*XX(K,1)+XX(K,2)*XX(K,2)+XX(K,3)*XX(K,3))
66     83 AR(K)=DA
67        CALL QDRTR(B(L),AR,1.,1,KT)
68     85 CONTINUE
69        CALL QDRTR(A,B,1.,1,LT)
70     95 RETURN
71        END
```

```
1  *DECK INFLOW
2        SUBROUTINE INFLOW
3  *CALL COM1
4        ITOT=LMAX
5        INWALL =LW
6        XXX=X(1)/ZT
7        RWI=RWFUNC(XXX)*ZT
8        RWO=RWOUT(XXX)*ZT
9        GAMI=GAMMA/(GAMMA-1.)
10       DELI=.05
11       DELO=1.0
12       DO 35 L=1,LW
13       RI(L)=RL(L)
14       RR=(RWI-RI(L))/DELI
15       IF(RR.GE.1) GO TO 20
16       IF(RR.GT.3.E-3) GO TO 15
17       UUE=145.3*RR
18       GO TO 30
19    15 UUE=RR**(1./7.)
20       GO TO 30
21    20 UUE=1.
22    30 CONTINUE
23       HTI(L)=1.
24       VROUI(L)=0.
25       PTI(L)=(1.+(GAMMA-1)/2.*EMC(1)**2*(1.-UUE*UUE))**(-GAMI)
26       WRITE(6,100) L,RI(L),PTI(L),HTI(L),VROUI(L)
27   100 FORMAT(22H L,RI,PTI,HTI,VROUI= ,I3,1P4E12.5)
28    35 CONTINUE
29       LW1=LW+1
30       DO 70 L=LW1,LMAX
31       RI(L)=RL(L)
32       VROUI(L)=0.
33       UUO=(RI(L)-RWO)/DELO
34       IF(UUO.GT.1.) GO TO 50
35       UUO=UUO**(1./7.)
36       GO TO 60
37    50 UUO=1.
38    60 SAVE=(GAMMA-1.)/2.*FSMACH**2
39       HTI(L)=FST*(1.+SAVE)
40       PTI(L)=FSP*((1.+SAVE)/(1.+SAVE*(1-UUO*UUO)))**GAMI
41       WRITE(6,100) L,RI(L),PTI(L),HTI(L),VROUI(L)
42    70 CONTINUE
43       RETURN
44       END
```

```
      *DECK INITQ
            SUBROUTINE INITQ
      C     INITIALIZE FLOW VARIABLES Q(L,N,K) AT GRID POINTS
      *CALL COM1
            DIMENSION ETA(13),FP(13),G(13)
            DIMENSION PT(32),HT(32),VROU(32),ZRL(32)
            DIMENSION TE(32)
            DATA ETA/0.0,0.5,1.0,1.5,2.0,2.5,3.0,3.5,4.0,4.5,5.0,5.5,6.0/
            DATA FP/0.0,.16586,.32979,.48652,.62977,.75073,.84605,.91255,
           1                                .95552,.97928,.99155,.99682,.99898/
            DATA G/0.0,.03978,.16422,.35812,.60951,.87940,1.14133,1.3557,
           1                          1.51632,1.61644,1.67446,1.70189,1.71424/
            EMC2(B)=1.+FLOAT(IJ)*B**.5
            FUNC(A)=4.*EMC2(A)*(1.+(GAMMA-1.)/2.*EMC2(A))
      C     INITIAL DATA FOR FLAT PLATE BOUNDARY LAYER(NOPT=0)
            IF (NOPT.GT.0) GO TO 45
            DO 10 I=1,13
         10 ETA(I)=ETA(I)/6.0
            DO 40 J=1,JWMAX
            CALL LKPGAS(J,2)
            DO 35 L=LWF,LMAX
            ZETA=(L-1.0)/(LMAX-1.0)
            ZETAE=(LE-1.)/(LMAX-1.0)
            ZFAC=(FN+1.)*(FN**(ZETA/(1.-ZETAE))-1.)/(FN**(1./(1.-ZETAE))-1.)
            IF(ZFAC.EQ.0.) EZFAC=1.
            IF(ZFAC.EQ.0.) GO TO 12
            EZFAC=EXP(-(6.1*ZFAC)**2)
         12 G4=1.71424*FSMACH*EZFAC/2.0
            G5=1.0/(GAMMA*(GAMMA-1.0))
            DO 35 K=1,KMAX
            ETAJ=Q(L,8,K)*SQRT(RE/Q(L,6,K))/ETAE
            IF (ETAJ.GT.1.0) GO TO 30
            DO 15 I=1,13
            IF (ETA(I).GT.ETAJ) GO TO 20
         15 CONTINUE
            I=12
         20 IF(I.EQ.13) I=12
            IE=I
            CALL TRPOL8(ETAJ,ETA,FP,I-1,FPJ)
            CALL TRPOL8(ETAJ,ETA,G,I-1,GJ)
            U=FSMACH*FPJ
            V=0.0
            W=FSMACH*GJ/(2.0*SQRT(Q(L,6,K)*RE))
            Q(L,1,K)=1.0/(1.0+.5*(GAMMA-1.0)*FSMACH**2*(1.0-(U/FSMACH)**2))
            IF (TW.LE.0.0) GO TO 25
            TB=TW+(U/FSMACH)*(1.0-TW+(GAMMA-1.0)/2.0*FSMACH**2*(1.0-U/FSMACH))
            Q(L,1,K)=1.0/TB
         25 Q(L,2,K)=Q(L,1,K)*U
            Q(L,3,K)=Q(L,1,K)*V
            Q(L,4,K)=Q(L,1,K)*W
            Q(L,5,K)=G5+.5*(Q(L,2,K)**2+Q(L,3,K)**2+Q(L,4,K)**2)/
           1                                                        Q(L,1,K)
            GO TO 35
         30 Q(L,1,K)=1.0
            Q(L,2,K)=FSMACH
            Q(L,3,K)=0.0
            Q(L,4,K)=G4/SQRT(Q(L,6,K)*RE)
            IF(FSMACH.LE.1.)Q(L,4,K)=1.71424*FSMACH/(2.*SQRT(Q(L,6,K)*RE))
            Q(L,5,K)=G5+.5*(Q(L,2,K)**2+Q(L,3,K)**2+Q(L,4,K)**2)/
           1                                                        Q(L,1,K)
         35 CONTINUE
            CALL LKPGAS(J,1)
         40 CONTINUE
            GO TO 999
      C     INITIAL DATA FOR INTERIOR OF 2D NOZZLE
         45 CONTINUE
            IF (NOPT.EQ.3) GO TO 85
            LE=(LMAX+1)/2
            IF(LW.GT.0) LE=(LW+1)/2
      C     SET STAGNATION PRESSURE AND TEMPERATURE
            T0=1.0
            P0=1.0
            LMW=LMAX
            IF(LW.GT.0) LMW=LW
      C     1-D ISENTROPIC CHOKED FLOW
            CALL XYZXI(KMAX,JMAX,LMW)
            DO 80 I=1,2
            IF (JT.EQ.JMAX.AND.I.EQ.1) GO TO 80
            IF(I.EQ.1) IJ=+1
            IF(I.EQ.2) IJ=-1
            J=JT
            CALL LKPGAS(J,2)
            PHIJ=0.
            XXX=Q(1,6,1)
            CALL GEOM(XXX,AJ,ZZT)
            EMC(J)=1.
```

```
                NOZLIC - INITQ
 87  C      AVERAGE FLOW VARIABLES
 88     50 TC(J)=T0/(1.+(GAMMA-1.)/2.*EMC(J)**2)
 89        PC(J)=P0*TC(J)**(GAMMA/(GAMMA-1.))
 90        UC(J)=EMC(J)*TC(J)**.5
 91        DO 75 L=1,LMW
 92        DO 75 K=1,KMAX
 93        IF (L.GT.LE) GO TO 55
 94        UL=UC(J)
 95        TL=TC(J)
 96        GO TO 65
 97     55 UL=UC(J)*FLOAT(LMW-L)/FLOAT(LMW-LE)
 98        IF (TW.GT.0) GO TO 60
 99        TL=TC(J)*(1.+(GAMMA-1.)/2.*EMC(J)**2*(1.-(UL/UC(J))**2))
100        GO TO 65
101     60 TL=TW+(UL/UC(J))*(-TW+TC(J)*(1.+(GAMMA-1.)/2.*EMC(J)**2*(1.-UL/
102       1  UC(J))))
103     65 VL=0.
104        XJ=Q(L,13,K)
105        YJ=Q(L,14,K)
106        ZJ=Q(L,15,K)
107        WL=UL*ZJ/XJ
108        IF (NOPT.LT.2) GO TO 70
109        IF(K.EQ.1) VR=UL*ZJ/XJ
110        VL=VR*SIN(TH(K))
111        WL=VR*COS(TH(K))
112     70 CONTINUE
113        RHOL=PC(J)/TL
114        EL=PC(J)/(GAMMA*(GAMMA-1.))+RHOL*((UL*UL+VL*VL+WL*WL)/2.)
115        Q(L,1,K)=RHOL
116        Q(L,2,K)=RHOL*UL
117        Q(L,3,K)=RHOL*VL
118        Q(L,4,K)=RHOL*WL
119        Q(L,5,K)=EL
120     75 CONTINUE
121        CALL LKPGAS(J,1)
122        IF (J.EQ.JMAX) GO TO 80
123        IF (J.EQ.1) GO TO 80
124        J=J+IJ
125        AB=AJ
126        CALL LKPGAS(J,2)
127        XXX=Q(1,6,1)
128        CALL GEOM(XXX,AJ,ZZT)
129        DELPSI=ALOG(AJ/AB)
130        PHIHAT=PHIJ+DELPSI*FUNC(PHIJ)
131        PHIJ=.5*(PHIJ+PHIHAT+DELPSI*FUNC(PHIHAT))
132        EMC(J)=EMC2(PHIJ)**.5
133        GO TO 50
134     80 CONTINUE
135        IF(NOPT.EQ.2.AND.ITOT.EQ.0.AND.IGEOM.EQ.0) CALL INFLOW
136     85 CONTINUE
137        IF (ITOT.EQ.0) GO TO 145
138        CALL LKPGAS(1,2)
139        DO 100 I=1,ITOT
140        IF (LW.GT.0) GO TO 90
141        RI(I)=RI(I)/RI(ITOT)
142        GO TO 100
143     90 IF (I.GT.INWALL) GO TO 95
144        RI(I)=RI(I)/RI(INWALL)
145        GO TO 100
146     95 IF(I.EQ.INWALL+1) RISAVE=RI(INWALL+1)
147        RI(I)=(RI(I)-RISAVE)/(RI(ITOT)-RISAVE)
148    100 CONTINUE
149        DO 120 L=1,LMAX
150        LL=LMAX
151        IF (LW.EQ.0) GO TO 110
152        LL=LW
153        IF (L.LE.LW) GO TO 110
154        IF (NOPT.GT.1) GO TO 105
155        ZRL(L)=(Q(L,8,1)-Q(LL+1,8,1))/(Q(LMAX,8,1)-Q(LL+1,8,1))
156        GO TO 120
157    105 ZRL(L)=(RL(L)-RL(LW+1))/(RL(LMAX)-RL(LW+1))
158        GO TO 120
159    110 IF (NOPT.GT.1) GO TO 115
160        ZRL(L)=Q(L,8,1)/Q(LL,8,1)
161        GO TO 120
162    115 ZRL(L)=RL(L)/RL(LL)
163    120 CONTINUE
164  C
165  C     INTERPOLATE RADIAL DISTRIBUTION OF PRESSURE AND TOTAL ENTHALPY
166  C     TO ACTUAL GRID
167  C
168        DO 135 L=1,LMAX
169        IF(L.GT.LW) GO TO 131
170        DO 130 I=1,INWALL
171        C1=ZRL(L)-RI(I)
172        C2=RI(I+1)-ZRL(L)
173        IF (C1*C2) 130,125,125
```

```
174     125 PT(L)=(C1*PTI(I+1)+C2*PTI(I))/(C1+C2)
175         HT(L)=(C1*HTI(I+1)+C2*HTI(I))/(C1+C2)
176         VROU(L)=(C1*VROUI(I+1)+C2*VROUI(I))/(C1+C2)
177         GO TO 135
178     130 CONTINUE
179     131 INW1=INWALL+1
180         DO 134 I=INW1,ITOT
181         C1=ZRL(L)-RI(I)
182         C2=RI(I+1)-ZRL(L)
183         IF (C1*C2) 134,132,132
184     132 PT(L)=(C1*PTI(I+1)+C2*PTI(I))/(C1+C2)
185         HT(L)=(C1*HTI(I+1)+C2*HTI(I))/(C1+C2)
186         VROU(L)=(C1*VROUI(I+1)+C2*VROUI(I))/(C1+C2)
187         GO TO 135
188     134 CONTINUE
189     135 CONTINUE
190         DO 140 L=1,LMAX
191         DO 140 K=1,KMAX
192         PTOT(L,K)=PT(L)
193         HTOT(L,K)=HT(L)
194         VOU(L,K)=VROU(L)*SIN(TH(K))
195         WOU(L,K)=VROU(L)*COS(TH(K))
196     140 CONTINUE
197     145 CONTINUE
198         IF (ICRUDE.NE.0) GO TO 190
199         IF (ITOT.EQ.0) GO TO 155
200         CALL LKPGAS(1,2)
201         DO 150 K=1,KMAX
202         DO 150 L=1,LMW
203         PCTOT=(PC(1)/PTOT(L,K))**((GAMMA-1.)/GAMMA)
204         VLS=2.*HTOT(L,K)*(1.-PCTOT)/(GAMMA-1.)
205         VL=SQRT(VLS)
206         Q(L,1,K)=PTOT(L,K)/HTOT(L,K)*(PC(1)/PTOT(L,K))**(1.0/GAMMA)
207         Q(L,2,K)=Q(L,1,K)*VL/SQRT(1.+VOU(L,K)**2+WOU(L,K)**2)
208         Q(L,3,K)=Q(L,2,K)*VOU(L,K)
209         Q(L,4,K)=Q(L,2,K)*WOU(L,K)
210         T=HTOT(L,K)*PCTOT
211         Q(L,5,K)=Q(L,1,K)*(T/(GAMMA*(GAMMA-1.))+VLS/2.)
212     150 CONTINUE
213         CALL LKPGAS(1,1)
214     155 CONTINUE
215         IF(ICRUDE.NE.0) GO TO 190
216         IF(KREADY.GT.0) CALL SIDWIC
217         CONTINUE
218 C       BOUNDARY LAYER THICKNESS FOR ADIABATIC B.C.
219         IF (IWRIT.NE.0) WRITE (6,165)
220     165 FORMAT(//T4,1HJ,T11,3HUCJ,T24,3HTCJ,T37,3HUEJ,T50,3HTEJ,
221        1 T62,5HDELTJ,T74,6HDELTZJ)
222 C
223         SJ=0.
224         CALL LKPGAS(1,2)
225         XXX=Q(1,6,1)
226         CALL GEOM(XXX,AJ,ZZT)
227         DELT(1)=FN/(1.+FN)*ZZT
228         DO 185 J=1,JMAX
229         CALL LKPGAS(J,2)
230         XJ=Q(LMAX,13,1)
231         YJ=Q(LMAX,14,1)
232         ZJ=Q(LMAX,15,1)
233         UE(J)=UC(J)*(1.+(ZJ/XJ)**2)**.5
234         TE(J)=1.-(GAMMA-1.)/2.*UE(J)**2
235         FJ=(2.+TE(J))/(UE(J)**5*TE(J)**((2.-GAMMA)/(GAMMA-1.)))
236         IF(J.EQ.1)F1=FJ
237         GJ=UE(J)**9*TE(J)**((4.-3.*GAMMA)/(GAMMA-1.))*(XJ*XJ+ZJ*ZJ)**.5
238         IF (J.EQ.1) GO TO 170
239         SJ=SJ+.5*(GJ+GJ1)
240         DELT(J)=FJ*((DELT(1)/F1)**2+(4./(3.*RE))*SJ)**.5
241     170 DELTZ(J)=DELT(J)*(1.+(ZJ/XJ)**2)**.5
242         GJ1=GJ
243         IF (IWRIT.NE.0) WRITE (6,180)J,UC(J),TC(J),UE(J),TE(J),DELT(J),DEL
244        1TZ(J)
245     180 FORMAT(2X,I2,6(2X,1PE11.4))
246     185 CONTINUE
247         GO TO 195
248     190 CALL CRUDIC
249     195 CONTINUE
250     999 RETURN
251         END
```

```
            NOZLIC - INPUT
 1  *DECK INPUT
 2        SUBROUTINE INPUT
 3  *CALL COM1
 4        DATA LWF/1/
 5  C     NOPT
 6  C             0   EXTERNAL 2-D BOUNDARY LAYERS
 7  C             1   INTERNAL FLOW IN 2-D NOZZLES
 8  C             2   AXIZYMMETRIC NOZZLES  AXIS IS AT Y=Z=0  (THE CARTESIAN
 9  C                     L=1,K=1,KMAX
10  C                 PURE INTERNAL FLOW OR COMBINED EXTERNAL/INTERNAL FLOW
11  C                 FOR KW>0 OR LW>0  SET ICRUDE=1
12  C                 FOR JL1WU > 0 SET ICRUDE=1
13  C             3   ARBITRARY NONAXISYMMETRIC NOZZLES
14  C                 FOR KW > 0 OR LW > 0 SET ICRUDE =1
15  C
16  C     IRGRID
17  C             0   COMPUTE THE GRID
18  C             1   READ IN THE GRID FROM A FILE PREPARED BY RGRID
19  C
20  C     ICRUDE
21  C             0   USE THE CODE INITQ TO GET THE INITIAL Q'S
22  C             1   USE THE CODE CRUDIC TO GET THE INITIAL Q'S
23        READ (5,10)NMAX,JMAX,KMAX,LMAX,LAMIN,INVISC,J1BC,JMAXBC,KPLANE,K1B
24       1C,JK1WL,JK1WU,KW,JKW,KMAXBC
25        READ (5,10)L1BC,JL1WL,JL1WU,LW,JLW,LMAXBC,NRST,IWRIT,NGRI,NP,KVIS
26       1,LVIS,KLVIS,INFLT,ISUTH,NROUT
27        READ (5,15)DT,FSMACH,RMACH,RE,PR,RTDEGK,FSP,FST
28        READ (5,15)GAMMA,RMUEXP,TW,CNBR,DTFAC,RM,SMU,OMEGA
29     10 FORMAT(1615)
30     15 FORMAT(8F10.0)
31        READ (5,10)NOPT,JREADX,IGEOM,KREADY,IRGRID,ICRUDE,ITOT,INWALL
32        READ (5,15)XZERO,XMAX,FN,YMAX
33        IF (JREADX.GT.0) READ (5,15)(X(J),J=1,JREADX)
34        IF (KREADY.GT.0) READ (5,15)(YKR(K),K=1,KREADY)
35        IF (ITOT.EQ.0) GO TO 25
36        DO 20 I=1,ITOT
37        READ (5,15)RI(I),PTI(I),HTI(I),VROUI(I)
38     20 CONTINUE
39     25 ALP=0.
40        ITMAX=NMAX
41        WRITE (6,30)NMAX,JMAX,KMAX,LMAX,LAMIN,INVISC,J1BC,JMAXBC,KPLANE,K1
42       1BC,JK1WL,JK1WU,KW,JKW,KMAXBC
43        WRITE (6,35)L1BC,JL1WL,JL1WU,LW,JLW,LMAXBC,NRST,IWRIT,NGRI,NP,KVIS
44       1,LVIS,KLVIS,INFLT,ISUTH,NROUT
45        WRITE (6,40)DT,FSMACH,RMACH,RE,PR,RTDEGK,FSP,FST
46        WRITE (6,45)GAMMA,RMUEXP,TW,CNBR,DTFAC,RM,SMU,OMEGA
47     30 FORMAT(122H1     NMAX     JMAX     KMAX     LMAX     LAMIN   INVISC    J1
48       1BC    JMAXBC   KPLANE    K1BC     JK1WL    JK1WU     KW       JKW    KMAXB
49       1C     /1618)
50     35 FORMAT(//132H      L1BC     JL1WL    JL1WU     LW       JLW    LMAXBC
51       1 NRST    IWRIT    NGRI      NP       KVIS     LVIS    KLVIS    INFLT    IS
52       2UTH     NROUT          /1618)
53     40 FORMAT(//7X,2HDT,10X,6HFSMACH,10X,5HRMACH
54       1,12X,2HRE,13X,2HPR,11X,6HRTDEGK,10X,3HFSP,13X,3HFST,/1P8E15.7)
55     45 FORMAT(//5X,5HGAMMA,10X,6HRMUEXP,11X,2HTW,12X,4HCNBR,10X,5HDTFAC,
56       113X,2HRM,12X,3HSMU,11X,5HOMEGA/1P8E15.7///)
57        WRITE (6,50)NOPT,JREADX,IGEOM,KREADY,IRGRID,ICRUDE,ITOT,INWALL
58     50 FORMAT(/  66H      NOPT   JREADX    IGEOM   KREADY   IRGRID   ICRUDE
59       1ITOT   INWALL                /1618     )
60        WRITE (6,55)XZERO,XMAX,FN,YMAX
61     55 FORMAT(/5X,5HXZERO,10X,4HXMAX,13X,2HFN,12X,4HYMAX,
62       1      /1P4E15.7)
63        IF (JREADX.GT.0) WRITE (6,60)(X(J),J=1,JREADX)
64     60 FORMAT(/8H  X(J)=   (8F10.5))
65        IF (KREADY.GT.0) WRITE (6,65)(YKR(K),K=1,KREADY)
66     65 FORMAT(8H  Y(K)=    (8F10.5))
67        IF (ITOT.EQ.0) GO TO 85
68        WRITE (6,70)
69     70 FORMAT(T4,1HI,T16,2HRI,T28,3HPTI,T41,3HHTI,T53,5HVROUI)
70        DO 80 I=1,ITOT
71        WRITE (6,75)I,RI(I),PTI(I),HTI(I),VROUI(I)
72     75 FORMAT(2X,I2,6X,4(2X,1PE11.4))
73     80 CONTINUE
74     85 CONTINUE
75        IF(IRGRID.EQ.0) GO TO 110
76        IF(NOPT.NE.3) GO TO 110
77        WRITE(6,89)
78     89 FORMAT(T8,1HL,T15,1HK,T24,4HPTOT,T38,4HHTOT,T52,3HVOU,T65,3HWOU)
79        NKL=KMAX*LMAX
80        DO 100 I=1,NKL
81        READ(5,90) L,K,PTOT(L,K),HTOT(L,K),VOU(L,K),WOU(L,K)
82     90 FORMAT(2I5,4F10.0)
83        WRITE(6,95) L,K,PTOT(L,K),HTOT(L,K),VOU(L,K),WOU(L,K)
84     95 FORMAT(4X,2(I5,2X),4(2X,1PE11.4))
85    100 CONTINUE
86    110 CONTINUE
```

```
                NOZLIC - INPUT
87          RETURN
88          END
```

```
*DECK LAGRAN
      SUBROUTINE LAGRAN (XX,X,FT)
      DIMENSION X(4),FT(4),A(4),B(4),C(4),D(4),E(4)
      DO 5 I=1,4
      A(I)=XX-X(I)
      B(I)=X(1)-X(I)
      C(I)=X(2)-X(I)
      D(I)=X(3)-X(I)
    5 E(I)=X(4)-X(I)
      IF (XX.GT.X(2)) GO TO 7
      FT(4)=0.
      FT(1)=(A(2)*A(3))/(B(2)*B(3))
      FT(2)=(A(1)*A(3))/(C(1)*C(3))
      FT(3)=(A(1)*A(2))/(D(1)*D(2))
      RETURN
    7 IF (XX.LT.X(3)) GO TO 8
      FT(1)=0.
      FT(2)=(A(3)*A(4))/(C(3)*C(4))
      FT(3)=(A(2)*A(4))/(D(2)*D(4))
      FT(4)=(A(2)*A(3))/(E(2)*E(3))
      RETURN
    8 FT(1)=(A(2)*A(3)*A(4))/(B(2)*B(3)*B(4))
      FT(2)=(A(1)*A(3)*A(4))/(C(1)*C(3)*C(4))
      FT(3)=(A(1)*A(2)*A(4))/(D(1)*D(2)*D(4))
      FT(4)=(A(1)*A(2)*A(3))/(E(1)*E(2)*E(3))
      RETURN
      END
```

```
            NOZLIC - LJPGAS
 1  *DECK LJPGAS
 2        SUBROUTINE LJPGAS(K,N)
 3  *CALL COM1
 4        CALL DMPAST(13,(K-1)*NLROW,1)
 5        DO 10 J=1 ,JMAX
 6        IF(N.EQ.1)  CALL DMWAST(13,Q(1,1,J),NLROW)
 7        IF(N.EQ.2)  CALL DMRAST(13,Q(1,1,J),NLROW)
 8        CALL DMPAST(13,NLSKIP,-1)
 9     10 CONTINUE
10        RETURN
11        END
```

```
            NOZLIC - LKPGAS
1   *DECK LKPGAS
2         SUBROUTINE LKPGAS(J,N)
3   *CALL COM1
4         CALL DMPAST(13,(J-1)*NKLP,1)
5         IF(N.EQ.1)  CALL DMWAST(13,Q,NKLP)
6         IF(N.EQ.2)  CALL DMRAST(13,Q,NKLP)
7         RETURN
8         END
```

```
                NOZLIC - MAIN
 1  *DECK MAIN
 2        PROGRAM NOZLIC(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE2,TAPE15,
 3       1   TAPE3)
 4  C     MAIN ROUTINE TO SET UP GRID AND INITIALIZE FLOW VARIABLES
 5        DIMENSION IDPARS(4)
 6        IDPARS(1)=0
 7        IDPARS(2)=0
 8        IDPARS(3)=0
 9        IDPARS(4)=0
10        CALL DMHAST(3,0,0)
11        CALL DMDAST(13,0,IDPARS)
12        CALL INPUT
13        CALL NDLPTS
14        CALL INITQ
15        CALL OUTPUT
16        STOP
17        END
```

```
                NOZLIC - NDLPTS
 1  *DECK NDLPTS
 2        SUBROUTINE NDLPTS
 3  *CALL COMI
 4        DATA LWF/1/,JT/0/
 5        ZT=0.
 6  C
 7  C    ANY CHANGE IN SIZE OF Q ARRAY MUST BE REFLECTED IN THE FOLLOWING
 8  C   FIVE PARAMETERS
 9  C
10        NMAX=16
11        NOL=32
12        NLROW=NMAX*NOL
13        NKLP=NMAX*KMAX*NOL
14        NLSKIP=NKLP-NLROW
15        PI=4.*ATAN(1.)
16        JWMAX=JMAX
17        IF(NOPT.GT.0 .AND. FN.NE.0) FN=(1.0-FN)/FN
18        ETAE=6.0*(1.0+0.07*FSMACH*(0.2+FSMACH))
19        DO 95 J=1,JMAX
20        IF (IRGRID.EQ.0) GO TO 20
21        READ(3) Q(1,6,1),((Q(L,7,K),Q(L,8,K),K=1,KMAX),L=1,LMAX)
22        DO 10 L=1,LMAX
23        DO 10 K=1,KMAX
24     10 Q(L,6,K)=Q(1,6,1)
25  C
26  C... SEARCH FOR THROAT
27        IF (Q(1,6,1).NE.0) GO TO 15
28        LL=LMAX
29        IF(LW.GT.0) LL=LW
30        ZTSAVE=Q(LL,8,1)-Q(1,8,1)
31        JT=J
32     15 CONTINUE
33        GO TO 90
34     20 CONTINUE
35        DO 75 K=1,KMAX
36        TH(1)=0.
37        YJKL=0.
38        IF (KMAX.EQ.1) GO TO 25
39        TH(K)=PI/2.*FLOAT(K-1)/FLOAT(KMAX-1)
40        YJKL=YMAX*FLOAT(K-1)/FLOAT(KMAX-1)
41     25 CONTINUE
42        DO 75 L=LWF,LMAX
43        IF (JREADX.GT.0) GO TO 30
44        Q(L,6,K)=XZERO+FLOAT(J-1)/FLOAT(JMAX-1)*(XMAX-XZERO)
45        GO TO 35
46     30 Q(L,6,K)=X(J)
47     35 CONTINUE
48        CALL STRCH(J,K,L,ZFAC)
49        IF (NOPT.LT.2) GO TO 50
50        XXX=Q(L,6,K)
51        IF (LW.GT.0.AND.L.GT.LW) GO TO 40
52        RJL=RWFUNC(XXX)*ZFAC
53        GO TO 45
54     40 RJL=RWOUT(XXX)+(RMAX(XXX)-RWOUT(XXX))*ZFAC
55     45 Q(L,7,K)=RJL*SIN(TH(K))
56        Q(L,8,K)=RJL*COS(TH(K))
57        IF(K.EQ.1 .AND. J.EQ.1) RL(L)=RJL
58        GO TO 75
59     50 IF (KREADY.GT.0) GO TO 55
60        Q(L,7,K)=YJKL
61        GO TO 60
62     55 IF(K.LE.KREADY) Q(L,7,K)=YKR(K)
63     60 IF (NOPT.NE.0) GO TO 65
64        ZZ=ETAE*SQRT(Q(L,6,K)/RE)
65        GO TO 70
66     65 XXX=Q(L,6,K)
67        CALL GEOM(XXX,AA,ZZ)
68     70 Q(L,8,K)=ZZ*ZFAC
69     75 CONTINUE
70        IF(KREADY.GT.0 .AND. KREADY.LT.KMAX) CALL YSTRCH(YKR(KREADY))
71        CONTINUE
72  C    SEARCH FOR THROAT
73  C     SAVE A Z IN CASE JT=1   WHEN YOU CAN'T FIND AN  X=0.
74        IF(J.EQ.1) ZTSAVE=Q(LMAX,8,1)
75        IF (Q(1,6,1).NE.0) GO TO 80
76        JT=J
77        LL=LMAX
78        IF(LW.GT.0) LL=LW
79        ZTSAVE=Q(LL,8,1)
80        GO TO 85
81     80 CONTINUE
82     85 CONTINUE
83     90 CONTINUE
84  C     IF(NOPT.EQ.2) CALL SCALE
85           CALL LKPGAS(J,1)
86     95 CONTINUE
```

```
            NOZLIC - NDLPTS
87          IF(JT.EQ.0) JT=1
88          WRITE (6,100)JT
89      100 FORMAT(2X,21HNOZZLE THROAT AT JT= I3)
90          IF (NOPT.LT.1) GO TO 110
91          IF(NOPT.GT.1) ZT=ZTSAVE
92          DO 105 J=1,JMAX
93          CALL LKPGAS(J,2)
94          CALL SCALE
95          CALL LKPGAS(J,1)
96      105 CONTINUE
97      110 CONTINUE
98          RETURN
99          END
```

```
      *DECK OUTPUT
            SUBROUTINE OUTPUT
      *CALL COM1
            IT=0
            GD=GAMMA*(GAMMA-1.)
            TAU=0.0
            CNBR=0.0
            NK=0
            ND2=KMAX*LMAX
            WRITE(2) KMAX,JMAX,LMAX,ITMAX,LMAXBC,LIBC,FSMACH,GAMMA,RE,SMU,DT
           1                                                      ,ALP,CNBR,PR
            WRITE(2) IT,TAU,DT,NK
            DO 90 J=1,JMAX
            CALL LKPGAS(J,2)
            IF (IWRIT.EQ.0) GO TO 40
            DO 35 K=1,KMAX
            WRITE (6,25)J,K
         25 FORMAT(1H0,2X,2HJ=,I3,2X,2HK=,I3,2X,1HL,6X,1HX,11X,1HY,11X,1HZ
           1   ,6X,6HR/RREF,5X,6HU/AREF,5X,6HV/AREF,5X,6HW/AREF,5X,6HT/TREF,
           1 5X,6HP/PREF,5X,3HENT)
            DO 35 L=1,LMAX
            R = Q(L,1,K)
            RR = 1./R
            U = Q(L,2,K)*RR
            V = Q(L,3,K)*RR
            W = Q(L,4,K)*RR
            E = Q(L,5,K)
            S2=0.0
            IF(ABS(U).GT.1.0E-17) S2=S2+U**2
            IF(ABS(V).GT.1.0E-17) S2=S2+V**2
            IF(ABS(W).GT.1.0E-17) S2=S2+W**2
            PP = GD*(E-.5*R*S2)
            TT=PP*RR
            ENT = PP/(ABS(R))**GAMMA
            WRITE (6,30)L,Q(L,6,K),Q(L,7,K),Q(L,8,K),R,U,V,W,TT,PP,ENT
         30 FORMAT(1H ,14X,I3,10F11.6)
         35 CONTINUE
         40 CONTINUE
         50 WRITE(2) (((Q(L,N,K),L=1,LMAX),N=1,8),K=1,KMAX)
         90 CONTINUE
      C     IF(NOPT.EQ.1) WRITE(3)EMC,UC,PC,TC,UE,DELT,DELTZ
            RETURN
            END
```

NOZLIC - QCALC

```
1  *DECK QCALC
2        SUBROUTINE QCALC(J,K,L,HT,PT,P)
3  *CALL COM1
4        XJ=Q(L,13,K)
5        YJ=Q(L,14,K)
6        ZJ=Q(L,15,K)
7        T=HT*(P/PT)**((GAMMA-1.)/GAMMA)
8        RHO=P/T
9        VLS=2./(GAMMA-1.)*ABS(HT-T)
10       V=SQRT(VLS)
11       R=SQRT(XJ*XJ+YJ*YJ+ZJ*ZJ)
12       Q(L,1,K)=RHO
13       Q(L,2,K)=RHO*V*XJ/R
14       Q(L,3,K)=RHO*V*YJ/R
15       Q(L,4,K)=RHO*V*ZJ/R
16       Q(L,5,K)=RHO*(T/(GAMMA*(GAMMA-1.))+VLS/2.)
17       RETURN
18       END
```

```
                NOZLIC - QDRTR
 1  *DECK QDRTR
 2        SUBROUTINE QDRTR(ENTGRL,ENTGRD,DLT,IL,IU)
 3        DIMENSION ENTGRD(1)
 4  C     1-D TRAPEZOIDAL QUADRATURE. COMPUTES DEFINITE INTEGRAL,ENTGRL,
 5  C     OF INTEGRAND,ENTGRD(I),BETWEEN LIMITS IL,IU.
 6  C
 7        ENTGRL=0.5*(ENTGRD(IL)+ENTGRD(IU))
 8        IF((IU-IL).LT.2) RETURN
 9        ILP=IL+1
10        IUM=IU-1
11        DO 1 I=ILP,IUM
12      1 ENTGRL=ENTGRL+ENTGRD(I)
13        ENTGRL=ENTGRL*DLT
14        RETURN
15        END
```

```
1  *DECK QZERO
2        SUBROUTINE QZERO(J,K,L,HT,PT,P)
3  *CALL COM1
4        T=HT*(P/PT)**((GAMMA-1.)/GAMMA)
5        RHO=P/T
6        Q(L,1,K)=RHO
7        Q(L,2,K)=0.
8        Q(L,3,K)=0.
9        Q(L,4,K)=0.
10       Q(L,5,K)=RHO*T/(GAMMA*(GAMMA-1.))
11       RETURN
12       END
```

```
1   *DECK RMAX
2         FUNCTION RMAX(XIN)
3   *CALL COM1
4         DIMENSION XINPUT(28),RIN(28)
5         DATA XINPUT/-34.5,-29.5,-24.5,-19.5,-15.5,-12.5,-10.1,-8.4,-7.0,
6        1   -5.842,-4.953,-4.064,-3.048,
7        2  -2.032,-1.016,0.,1.08,2.17,3.26,4.35,5.44,6.53,7.62,8.7,
8        3  10.,11.5,13.,14.5/
9         DATA RIN/28*12.62/
10        DATA IFIRST/0/
11        IF(ZT.EQ.0.) GO TO 5
12        IF(IFIRST.NE.0) GO TO 5
13        IFIRST=1
14        DO 2 J=1,JMAX
15        XINPUT(J)=XINPUT(J)/ZT
16        RIN(J)=RIN(J)/ZT
17      2 CONTINUE
18      5 CONTINUE
19        DO 10 J=1,JMAX
20        IF(XIN.NE.XINPUT(J)) GO TO 10
21        JFIND=J
22        GO TO 20
23     10 CONTINUE
24        GO TO 990
25     20 CONTINUE
26        RMAX=RIN(JFIND)
27        RETURN
28    990 WRITE(6,999)
29    999 FORMAT(2X,35H***ERROR IN RMAX FUNCTION ROUTINE**)
30        STOP
31        END
```

```
            NOZLIC - RWFUNC
 1  *DECK RWFUNC
 2        FUNCTION RWFUNC(XIN)
 3  *CALL COMI
 4        DIMENSION XINPUT(28),RIN(28)
 5        DATA XINPUT/-34.5,-29.5,-24.5,-19.5,-15.5,-12.5,-10.1,-8.4,-7.0,
 6       1   -5.842,-4.953,-4.064,-3.048,
 7       2  -2.032,-1.016,0.,1.08,2.17,3.26,4.35,5.44,6.53,7.62,8.7,
 8       3  10.,11.5,13.,14.5/
 9        DATA RIN/4*6.4315,6.336,6.194,5.996,5.820,5.653,5.436,5.019,4.585,
10       1  4.229,3.993,3.856,13*3.81/
11        DATA IFIRST/0/
12        IF(ZT.EQ.0.) GO TO 5
13        IF(IFIRST.NE.0) GO TO 5
14        IFIRST=1
15        DO 2 J=1,JMAX
16        XINPUT(J)=XINPUT(J)/ZT
17        RIN(J)=RIN(J)/ZT
18      2 CONTINUE
19      5 CONTINUE
20        DO 10 J=1,JMAX
21        IF(XIN.NE.XINPUT(J)) GO TO 10
22        JFIND=J
23        GO TO 20
24     10 CONTINUE
25        GO TO 990
26     20 CONTINUE
27        RWFUNC=RIN(JFIND)
28        RETURN
29    990 WRITE(6,999) XIN,XINPUT
30    999 FORMAT(2X,37H***ERROR IN RWFUNC FUNCTION ROUTINE**/(8E12.5))
31        STOP
32        END
```

```
          NOZLIC - RWOUT
 1  *DECK RWOUT
 2        FUNCTION RWOUT(XIN)
 3  *CALL COMI
 4        DIMENSION XINPUT(28),RIN(28)
 5        DATA XINPUT/-34.5,-29.5,-24.5,-19.5,-15.5,-12.5,-10.1,-8.4,-7.0,
 6       1   -5.842,-4.953,-4.064,-3.048,
 7       2  -2.032,-1.016,0.,1.08,2.17,3.26,4.35,5.44,6.53,7.62,8.7,
 8       3  10.,11.5,13.,14.5/
 9        DATA RIN/4*7.62,7.54624,7.38481,7.1898,
10       1  7.01605,6.85065,6.69854,6.57232,
11       2  6.43787,6.27408,6.09943,5.91386,5.71732,
12       3  5.49628,5.26045,5.01173,4.75002,4.47521,
13       4   4.18718,6*3.812/
14        DATA IFIRST/0/
15        IF(ZT.EQ.0) GO TO 5
16        IF(IFIRST.NE.0) GO TO 5
17        IFIRST=1
18        DO 2 J=1,JMAX
19        XINPUT(J)=XINPUT(J)/ZT
20        RIN(J)=RIN(J)/ZT
21      2 CONTINUE
22      5 CONTINUE
23        DO 10 J=1,JMAX
24        IF(XIN.NE.XINPUT(J)) GO TO 10
25        JFIND=J
26        GO TO 20
27     10 CONTINUE
28        GO TO 990
29     20 CONTINUE
30        RWOUT=RIN(JFIND)
31        RETURN
32    990 WRITE(6,999)
33    999 FORMAT(2X,36H***ERROR IN RWOUT FUNCTION ROUTINE**)
34        STOP
35        END
```

```
      *DECK SCALE
            SUBROUTINE SCALE
      *CALL COM1
            DIMENSION R(13)
            EQUIVALENCE (XMAX,R(1))
            DATA IFIRST/0/
              IOP=2
            IF(NOPT.EQ.1) IOP=13
            DO 10 L=1,LMAX
            DO 10 K=1,KMAX
            Q(L,6,K)=Q(L,6,K)/ZT
            Q(L,7,K)=Q(L,7,K)/ZT
            Q(L,8,K)=Q(L,8,K)/ZT
         10 CONTINUE
            IFIRST=IFIRST+1
             IF(IFIRST.NE.JWMAX) GO TO 30
            ZTT=ZT
            DO 20 I=1,IOP
            R(I)=R(I)/ZTT
         20 CONTINUE
         30 CONTINUE
            RETURN
            END
```

```
      *DECK SIDWIC
            SUBROUTINE SIDWIC
      C
      C      SIDE WALL INITIAL CONDITIONS
      *CALL COMI
            KE=(KMAX+1)/2
            DO 70 J=1,JMAX
            CALL LKPGAS(J,2)
            DO 65 L=1,LMAX
            U0=Q(L,2,KE)/Q(L,1,KE)
            DO 65 K=KE,KMAX
            UK=U0*(FLOAT(KMAX-K)/FLOAT(KMAX-KE))
            IF (TW.GT.0) GO TO 55
            TL=TC(J)*(1.+(GAMMA-1.)/2.*EMC(J)**2*(1.-(UK/UC(J))**2))
            GO TO 60
         55 TL=TW+(UK/UC(J))*(-TW+TC(J)*(1.+(GAMMA-1.)/2.*EMC(J)**2*(1.-UK/
           1  UC(J))))
         60 CONTINUE
            RHOL=PC(J)/TL
            EL=PC(J)/(GAMMA*(GAMMA-1.))+RHOL*UK*UK/2.
            Q(L,1,K)=RHOL
            Q(L,2,K)=RHOL*UK
            Q(L,3,K)=0.
            Q(L,4,K)=0.
            Q(L,5,K)=EL
         65 CONTINUE
            CALL LKPGAS(J,1)
         70 CONTINUE
            RETURN
            END
```

```
1   *DECK STRCH
2         SUBROUTINE STRCH(J,K,L,ZFAC)
3   *CALL COM1
4         DATA IFIRST/0/
5         IF(IFIRST.NE.0) GO TO 5
6         IFIRST=1
7         IFN=0
8         IF(FN.NE.0.) IFN=1
9       5 KL=(L-1)*KMAX+K
10        IF(IFN.NE.0) GO TO 12
11        XXX=Q(L,8,K)
12        IF(LW.NE.0 .AND. L.GT.LW) GO TO 11
13        FN=DELI(XXX)/RWFUNC(XXX)
14        GO TO 12
15      11 FN=DELOUT(XXX)/(RMAX(XXX)-RWOUT(XXX))
16      12 IF(LW.GT.0) GO TO 14
17        LE=(LMAX+1)/2
18        ZETA=FLOAT(L-1)/FLOAT(LMAX-1)
19        ZETAE=FLOAT(LE-1)/FLOAT(LMAX-1)
20        GO TO 30
21      14 IF(L.GT.LW) GO TO 20
22        LE=(LW+1)/2
23        ZETA=FLOAT(L-1)/FLOAT(LW-1)
24        ZETAE=FLOAT(LE-1)/FLOAT(LW-1)
25        GO TO 30
26      20 LE=(LMAX-LW+1)/2+LW+1
27        ZETA=1.-FLOAT(L-LW-1)/FLOAT(LMAX-LW-1)
28        ZETAE=FLOAT(LE-LW-1)/FLOAT(LMAX-LW-1)
29      30 ZFAC=(FN+1.)*(FN**(ZETA/(1.-ZETAE))-1.)/(FN**(1./(1.-ZETAE))-1.)
30        IF(NOPT.LT.1) GO TO 99
31        ZFAC=ZFAC/(FN+1.)
32        IF(L.GT.LW.AND.LW.GT.0) ZFAC=1.-ZFAC
33      99 RETURN
34        END
```

```
            NOZLIC - TRPOL8
 1  *DECK TRPOL8
 2        SUBROUTINE TRPOL8(XX,X,Y,I,YY)
 3        DIMENSION X(1),A(4),Y(1)
 4        IF(I.EQ.1) GO TO 100
 5        CALL LAGRAN(XX,X(I-1),A)
 6        YY=A(1)*Y(I-1)+A(2)*Y(I)+A(3)*Y(I+1)+A(4)*Y(I+2)
 7        RETURN
 8      100 YY=Y(1)+(Y(2)-Y(1))*(XX-X(1))/(X(2)-X(1))
 9        RETURN
10        END
```

```
1  *DECK XXM
2        SUBROUTINE XXM(L,J,K1,K2)
3  *CALL COM1
4  C
5  C  XI METRICS FORMED FOR A K,L LINE IN J
6  C
7  C
8  C  SYMMETRY
9  C
10       DO 10 K=K1,K2
11       CALL DKMET(J,K,L,XK,YK,ZK)
12       CALL DLMET(J,K,L,XL,YL,ZL)
13       XX(K,1) = YK*ZL-ZK*YL
14       XX(K,2) = ZK*XL-XK*ZL
15       XX(K,3) = XK*YL-YK*XL
16    10 CONTINUE
17       RETURN
18       END
```

NOZLIC - XYZXI

```
 1  *DECK XYZXI
 2        SUBROUTINE XYZXI(KMAX,JMAX,LMAX)
 3        COMMON /C1/ Q(32,16,32)
 4        DX2=.5
 5        DO 100 K=1,KMAX
 6        CALL LJPGAS(K,2)
 7        DO 70 L=1,LMAX
 8        DO 70 J=1,JMAX
 9        JP=J+1
10        JR=J-1
11  C     XI DERIVATIVES OF X,Y,Z
12        IF(J.EQ.1) GO TO 50
13        IF(J.EQ.JMAX) GO TO 51
14        Q(L,13,J) = (Q(L,6,JP)-Q(L,6,JR))*DX2
15        Q(L,14,J) = (Q(L,7,JP)-Q(L,7,JR))*DX2
16        Q(L,15,J) = (Q(L,8,JP)-Q(L,8,JR))*DX2
17        GO TO 70
18     50 J1 = J+1
19        Q(L,13,J)= Q(L,6,J1)-Q(L,6,J)
20        Q(L,14,J)= Q(L,7,J1)-Q(L,7,J)
21        Q(L,15,J)= Q(L,8,J1)-Q(L,8,J)
22        GO TO 70
23     51 J1 = J-1
24        Q(L,13,J)= Q(L,6,J)-Q(L,6,J1)
25        Q(L,14,J)= Q(L,7,J)-Q(L,7,J1)
26        Q(L,15,J)= Q(L,8,J)-Q(L,8,J1)
27     70 CONTINUE
28        CALL LJPGAS(K,1)
29    100 CONTINUE
30        RETURN
31        END
```

```
            NOZLIC - YSTRCH
 1  *DECK YSTRCH
 2        SUBROUTINE YSTRCH(YKREAD)
 3  C      ROUTINE TO EXPONENTIALLY STRETCH THE Y GRID FROM Y(KREADY+1) TO Y
 4  C
 5  *CALL COMI
 6        FD(W)=((W-1.)*EXP(W)+1.)/(W*W)
 7        F(W)=(EXP(W)-1.)/W-1./BETA
 8        DELE=1./(KMAX-KREADY)
 9        LM=LMAX-1
10        DELZ=Q(LMAX,8,1)-Q(LM,8,1)
11        BETA=DELZ/((YMAX-YKREAD)*DELE)
12  C
13  C     NEWTON ITERATION FOR Y STRETCHING COEFFICIENT
14        W1=20.
15        N=0
16     10 W2=W1-F(W1)/FD(W1)
17        N=N+1
18        ERR=ABS((W2-W1)/W2)
19        IF (ERR.LT.1.E-5) GO TO 20
20        W1SAVE=W1
21        W1=W2
22        IF (N.LT.20) GO TO 10
23  C
24  C     FAILURE TO CONVERGE
25  C
26        WRITE (6,15)W1SAVE,W2,ERR,N,YMAX,YKREAD,DELE,DELZ,BETA
27     15 FORMAT(81H****FAILURE TO CONVERGE IN NEWTON ITERATION FOR Y STRETC
28       1HING COEFFICIENT OMEGA***    /2X,3HW1=E10.3,4H W2=E10.3,5H ERR=,
29       2  E10.3,3H N=I2,/2X,6H YMAX= E10.3,8H YKREAD=E10.3,
30       3  6H DELE=  E10.3,  6H DELZ=E10.3,6H BETA=E10.3)
31        GO TO 40
32     20 CONTINUE
33        OMEGA=W2
34        OMEINV=1./(1.-EXP(-OMEGA))
35        KR1=KREADY+1
36          DO 30 K=KR1,KMAX
37          ETAK=FLOAT(K-KREADY)/FLOAT(KMAX-KREADY)
38          EXPOET=(1.-EXP(-OMEGA*ETAK))*OMEINV
39            DO 25 L=1,LMAX
40            Q(L,7,K)=YKREAD+(YMAX-YKREAD)*EXPOET
41     25       CONTINUE
42     30     CONTINUE
43     35 CONTINUE
44        RETURN
45  C*** ERROR STOP
46     40 STOP
47        END
```

NOZLIC - COMDECKS FOR DMGASP

NOZLIC - DMGASP

NOZLIC - IOMCIO

NOZLIC - IOMFAP

NOZLIC - IOMFIP

NOZLIC - IOMPFM

NOZLIC - IOMPRT

SEE APPENDIX A - NOZL3D PROGRAM LISTING - PAGES 94-141
FOR LISTINGS OF ABOVE INPUT-OUTPUT MANAGER ROUTINES

APPENDIX C

LISTING OF THE RGRIDD PROGRAM

```
1   *DECK ARCLEN
2         SUBROUTINE ARCLEN(XMIN,XMAX,A,B,XN,IMAX,S)
3         DX=(XMAX-XMIN)/IMAX
4         S=0.0
5         X=XMIN-DX
6         DO 500 I=1,2100
7         XS=X
8         X=X+DX
9         IF(X.GT.XMAX) DX=XMAX-XS
10        IF(X.GT.XMAX) X=XMAX
11        YS=Y
12        CALL FCT(A,B,XN,1,X,Y)
13        IF(I.EQ.1) GO TO 500
14        D=SQRT(DX**2+(Y-YS)**2)
15        S=S+D
16        IF(X.GE.XMAX) RETURN
17     500 CONTINUE
18        WRITE(6,600) IMAX,XN,DX,S,D,X,XS,Y,YS,XMIN,XMAX,A,B
19     600 FORMAT(29H STOPPED IN SUBROUTINE ARCLEN /I5,12E10.5)
20        STOP
21        END
```

```
                RGRIDD - AXIS
 1  *DECK AXIS
 2        SUBROUTINE AXIS(XMIN,XMAX,YMIN,YMAX,NXINTS,NYINTS,XRN,XRX,YRN,YRX)
 3  C
 4  C        THIS SUBROUTINE IS ONE OF THOSE THAT PLOTS GRIDS
 5  C        ON THE SC4020 PLOTTER.
 6  C
 7  C     THIS SUBROUTINE DRAWS THE X AND Y AXES, MARKS OFF THE
 8  C     INTERVALS, SETS THE SCALE VALUES, AND MOVES THE FILM TO A NEW
 9  C     FRAME.
10  C
11  C     XMIN IS THE MINIMUM VALUE OF THE X (HORIZONTAL) VARIABLE.
12  C     XMAX IS THE MAXIMUM VALUE OF THE X VARIABLE.
13  C     YMIN IS THE MINIMUM VALUE OF THE Y (VERTICAL) VARIABLE.
14  C     YMAX IS THE MAXIMUM VALUE OF THE Y VARIABLE.
15  C     NXINTS IS THE NUMBER OF INTERVALS INTO WHICH THE X AXIS IS TO
16  C          BE DIVIDED.
17  C     NYINTS IS THE NUMBER OF INTERVALS INTO WHICH THE Y AXIS IS TO
18  C          BE DIVIDED.
19  C
20  C     DO INITIALIZATION
21        CALL SMALLV
22        CALL FRAMEV(3)
23        NX=NXINTS
24        NY=NYINTS
25  C     IF NX OR NY .LE. 0 MAKE THEM EQUAL TO 1
26        IF (NX .LE. 0) NX=1
27        IF (NY .LE. 0) NY=1
28  C     SET UP VALUES TO BE USED FOR MARGINS
29        ML=123
30        MR=923
31        MB=123
32        MT=923
33  C     DRAW X AXIS
34        CALL LINEV(ML,MB,MR,MB)
35  C     DRAW Y AXIS
36        CALL LINEV(ML,MB,ML,MT)
37  C     DETERMINE INCREMENTS FOR TIC MARKS
38        DX=(XMAX-XMIN)/NX
39        DY=(YMAX-YMIN)/NY
40  C     SCALE X AND Y VALUES
41        CALL XSCALV(XMIN,XMAX,ML,100)
42        CALL YSCALV(YMIN,YMAX,MB,100)
43  C     DRAW TIC MARKS ON THE X AXIS
44        DX=(XRX-XRN)/NX
45        CALL LINRV(1,MB-20,MB-5,MB+5,XMIN,XMAX,DX,0,-1,3,8)
46  C     CALL LINEV(NXV(SING),NYV(0.0)-20,NXV(SING),NYV(0.0))
47  C     DRAW TIC MARKS ON Y AXIS
48        DY=(YRX-YRN)/NY
49        CALL LINRV(2,ML- 90,ML-5,ML+5,YRN,YRX,DY,0,-1,3,10)
50        RETURN
51        END
```

```
            RGRIDD - BDRYS
 1  *DECK BDRYS
 2        SUBROUTINE BDRYS(JMIN,JMAX,KMIN,KMAX,XMIN,XMAX,YMIN,YMAX,XN,DX1,
 3       |                     DY1,DS1,A,B,X,Y,IB,D1,D2,WL,WR,WB,WT,WOER,WOET)
 4        DIMENSION X(40,40),Y(40,40),WL(1),WR(1),WB(1),WT(1),WOER(1),
 5       |                                                    WOET(1),IB(10)
 6        EPSLON=.001
 7        J1=JMIN+1
 8        K1=KMIN+1
 9        KMAXM1=KMAX-1
10        JMAXM1=JMAX-1
11  C     LEFT SIDE OF RECTANGULAR GRID -- IB(5 OR 6)
12        IB1=5
13        IF(KMIN.GT.1) IB1=6
14        IF(IB(IB1).EQ.1) CALL WCALC(X,Y,WL,1,1,K1,KMAXM1)
15        IF(IB(IB1).EQ.1) GO TO 300
16        X(1,KMIN)=0.0
17        Y(1,KMIN)=YMIN
18        X(1,KMAX)=0.0
19        Y(1,KMAX)=YMAX
20        EY=EPSIL(YMAX-YMIN,0.0,DY1,KMAX-KMIN+1,0.001,100,1,1)
21        IF(KMIN.GT.1) GO TO 230
22        WLK=(KMAX-KMIN-1)*ALOG(1.0+EY)/(KMAX-KMIN)
23        DO 200 KK=K1,KMAXM1
24        K=KMAXM1-KK+K1
25        X(1,K)=X(1,K+1)
26        Y(1,K)=Y(1,K+1)-DY1*(1.0+EY)**(KMAXM1-K)
27        WL(K)=WLK
28      200 CONTINUE
29        GO TO 300
30      230 DO 240 K=1,KMIN
31      240 WL(K)=0.0
32        EYK=1.0/(1.0+EY)-1.0
33        WLK=(KMAX-KMIN-1)*ALOG(1.0+EYK)/(KMAX-KMIN)
34        DO 250 K=K1,KMAXM1
35        X(1,K)=X(1,K-1)
36        Y(1,K)=Y(1,K-1)+DY1*(1.0+EY)**(K-K1)
37        WL(K)=WLK
38      250 CONTINUE
39      300 IF(IB(1).NE.4) GO TO 350
40  C     BOTTOM, RIGHT SIDE AND TOP OF RECTANGULAR GRID BY ELLIPSE TEST CASE
41  C
42        CALL ELIPSE(XMAX,YMAX,X,Y,JMAX,KMAX,IB,DX1,WR,WB,WT,A,B,XN,EPSLON)
43        GO TO 700
44  C     BOTTOM OF RECTANGULAR GRID -- IB(1 OR 2)
45      350 IB1=1
46        IF(JMIN.GT.1) IB1=2
47        IF(IB(IB1).EQ.1) CALL WCALC(X,Y,WB,J1,JMAXM1,1,1)
48        IF(IB(IB1).EQ.1) GO TO 480
49        E=EPSIL(XMAX-XMIN,0.0,DX1,JMAX-JMIN+1,0.001,100,1,1)
50        X(JMAX,1)=XMAX
51        Y(JMAX,1)=0.0
52        X(JMIN,1)=XMIN
53        Y(JMIN,1)=0.0
54        IF(JMIN.GT.1) GO TO 430
55        WBJ=(JMAX-JMIN-1)*ALOG(1.0+E)/(JMAX-JMIN)
56        DO 400 JJ=J1,JMAXM1
57        J=JMAXM1-JJ+J1
58        X(J,1)=X(J+1,1)-DX1*(1.0+E)**(JMAXM1-J)
59        Y(J,1)=Y(J+1,1)
60        WB(J)=WBJ
61      400 CONTINUE
62        GO TO 480
63      430 DO 440 J=1,JMIN
64      440 WB(J)=0.0
65        EJ=1.0/(1.0+E)-1.0
66        WBJ=(JMAX-JMIN-1)*ALOG(1.0+EJ)/(JMAX-JMIN)
67        DO 450 J=J1,JMAXM1
68        X(J,1)=X(J-1,1)+DX1*(1.0+E)**(J-J1)
69        Y(J,1)=Y(J-1,1)
70        WB(J)=WBJ
71      450 CONTINUE
72  C     TOP AND RIGHT SIDE OF SUPER ELLIPSE -- IB(7&8 OR 9&10)
73      480 JMX=JMAX
74        IF(JMIN.GT.1) JMX=JMIN
75        KMX=KMAX
76        IF(KMIN.GT.1) KMX=KMIN
77        IB7=7
78        IF(KMIN.EQ.1) IB7=9
79        IB8=8
80        IF(JMIN.EQ.1) IB8=10
81        IF(IB7.EQ. 7.AND.IB(IB7).EQ.1)CALL WCALC(X,Y,WOER,JMX,JMX,2,KMX-1)
82        IF(IB7.EQ. 9.AND.IB(IB7).EQ.1)CALL WCALC(X,Y,WR  ,JMX,JMX,2,KMX-1)
83        IF(IB8.EQ. 8.AND.IB(IB8).EQ.1)CALL WCALC(X,Y,WOET,2,JMX-1,KMX,KMX)
84        IF(IB8.EQ.10.AND.IB(IB8).EQ.1)CALL WCALC(X,Y,WT  ,2,JMX-1,KMX,KMX)
85        IF(IB(IB7).EQ.1.AND.IB(IB8).EQ.1) GO TO 700
86        CALL SLOPE(A,B,XN,XD,YD)
```

```
                RGRIDD - BDRYS
 87         CALL ARCLEN(0.0,XD,A,B,XN,512,S1)
 88         CALL ARCLEN(0.0,YD,B,A,XN,512,S2)
 89         E1=EPSIL(S1,0.0,DS1,JMX,0.001,100,1,1)
 90         E2=EPSIL(S2,0.0,DS1,KMX,0.001,100,1,1)
 91         WTJ=(JMX-2)*ALOG(1.0+E1)/(JMX-1.0)
 92         WRK=(KMX-2)*ALOG(1.0+E2)/(KMX-1.0)
 93         DX=DS1*(1.0+E1)**(JMX-2)
 94         IF(IB(IBB).EQ.1) GO TO 550
 95         X1=0.0
 96         DO 500 J=2,JMX
 97         DS=DS1*(1.0+E1)**(JMX-J)
 98         CALL XOFS(DS,X1,DX,A,B,XN,EPSLON)
 99         X(J,KMX)=X1
100         CALL FCT(A,B,XN,1,X1,Y(J,KMX))
101         WT(J)=WTJ
102         IF(JMIN.GT.1) WOET(J)=WTJ
103    500 CONTINUE
104    550 IF(IB(IB7).EQ.1) GO TO 700
105         Y1=0.0
106         DY=DX
107         DO 600 K=2,KMX
108         DS=DS1*(1.0+E2)**(KMX-K)
109         CALL XOFS(DS,Y1,DY,B,A,XN,EPSLON)
110         CALL FCT(A,B,XN,2,X(JMX,K),Y1)
111         Y(JMX,K)=Y1
112         WR(K)=WRK
113         IF(KMIN.GT.1) WOER(K)=WRK
114    600 CONTINUE
115    700 IF(JMIN.GT.1) GO TO 800
116         D1=Y(1,2)-Y(1,1)
117         D2=Y(JMAX,2)-Y(JMAX,1)
118         CALL WCALC(X,Y,WR,JMAX,JMAX,2,KMAXM1)
119         CALL WCALC(X,Y,WL,1,1,2,KMAXM1)
120         CALL WCALC(X,Y,WT,2,JMAXM1,KMAX,KMAX)
121         CALL WCALC(X,Y,WB,2,JMAXM1,1,1)
122         RETURN
123  C      RIGHT OUTER BOUNDARY -- IB(3)
124    800 IF(IB(3).EQ.1) CALL WCALC(X,Y,WR,JMAX,JMAX,2,KMAXM1)
125         IF(IB(3).EQ.2) CALL ROB(X,Y,WR,JMIN,JMAX,KMIN,KMAX,YMAX)
126         IF(IB(3).GT.0) GO TO 1000
127         DY=YMAX/KMAXM1
128         DO 900 K=2,KMAX
129         X(JMAX,K)=X(JMAX,K-1)
130         Y(JMAX,K)=Y(JMAX,K-1)+DY
131    900 WR(K)=0.0
132  C      TOP OUTER BOUNDARY -- IB(4)
133   1000 IF(IB(4).EQ.1) CALL WCALC(X,Y,WT,2,JMAXM1,KMAX,KMAX)
134         IF(IB(4).EQ.2) CALL TOB(X,Y,WT,JMIN,JMAX,KMIN,KMAX)
135         IF(IB(4).GT.0) RETURN
136         DX=XMAX/JMAXM1
137         DO 1100 J=2,JMAX
138         X(J,KMAX)=X(J-1,KMAX)+DX
139         Y(J,KMAX)=Y(J-1,KMAX)
140   1100 WT(J)=0.0
141         RETURN
142         END
```

```
1   *DECK ELIPSE
2         SUBROUTINE ELIPSE(XMAX,YMAX,X,Y,JMAX,KMAX,IB,DX1,WR,WB,WT,A,B,XN,
3        |                                                                EPSLON)
4         COMMON /PLOTC/ SING
5   C     THIS SUBROUTINE SETS UP BOTTOM AND TOP OF ELLIPSE TEST CASE
6   C     THAT IS IB(1),IB(9),IB(10)
7         DIMENSION X(40,40),Y(40,40),IB(1),WR(1),WB(1),WT(1)
8         SING=SQRT(XMAX**XN-YMAX**XN)
9         KMAXM1=KMAX-1
10        JMAXM1=JMAX-1
11        X(JMAX,1)=SING
12        Y(JMAX,1)=0.0
13        X(1,1)=0.0
14        Y(1,1)=0.0
15        X(JMAX,KMAX)=XMAX
16        Y(JMAX,KMAX)=0.0
17        DX=DX1
18        E=EPSIL(XMAX-SING,0.0,DX,KMAX,0.001,100,1,1)
19        WRK=(KMAX-2)*ALOG(1.0+E)/KMAXM1
20  C     NEXT 3 STATEMENTS CAUSE EQUAL SPACING
21  C     E=0.0
22  C     DX=(XMAX-SING)/KMAXM1
23  C     WRK=0.0
24        DO 100 KK=2,KMAXM1
25        K=KMAXM1-KK+2
26        X(JMAX,K)=X(JMAX,K+1)-DX*(1.0+E)**(KMAXM1-K)
27        Y(JMAX,K)=0.0
28        WR(K)=WRK
29    100 CONTINUE
30        CALL SLOPE(A,B,XN,XD,YD)
31        CALL ARCLEN(0.0,XD,A,B,XN,512,S1)
32        CALL ARCLEN(0.0,YD,B,A,XN,512,S2)
33        DS1=.5*(S1+S2)/JMAXM1
34        E=EPSIL(S1+S2,0.0,DS1,JMAX,0.001,100,1,1)
35        WTJ=(JMAX-JJ-1)*ALOG(1.0+E)/(JMAX-JJ)
36        DX=DS1
37        X1=0.0
38  C     NEXT 3 STATEMENTS CAUSE EQUAL SPACING
39  C     E=0.0
40  C     DS1=2.0*DS1
41  C     WTJ=0.0
42        DO 300 J=2,JMAXM1
43        DS=DS1*(1.0+E)**(JMAX-J)
44        CALL XOFS(DS,X1,DX,A,B,XN,EPSLON)
45        IF(X1.GT.XD) GO TO 400
46        X(J,KMAX)=X1
47        CALL FCT(A,B,XN,1,X1,Y(J,KMAX))
48        WT(J)=WTJ
49    300 CONTINUE
50        RETURN 0
51    400 JJ=J
52        Y1=0.0
53        DY=DS1
54        JMJ=JMAX-JJ
55        DO 500 JMM=1,JMJ
56        J=JMAX-JMM
57        DS=DS1*(1.0+E)**(JMAXM1-J)
58        CALL XOFS(DS,Y1,DY,B,A,XN,EPSLON)
59        Y(J,KMAX)=Y1
60        CALL FCT(A,B,XN,2,X(J,KMAX),Y1)
61        WT(J)=WTJ
62    500 CONTINUE
63        DXX=X(2,KMAX)-X(1,KMAX)
64        E=EPSIL(SING,0.0,DXX,JMAX,0.001,100,1,1)
65        WBJ=(JMAX-2)*ALOG(1.0+E)/JMAXM1
66  C     NEXT 3 STATEMENTS CAUSE EQUAL SPACING
67  C     E=0.0
68  C     DXX=SING/JMAXM1
69  C     WBJ=0.0
70        DO 600 J=2,JMAXM1
71        X(J,1)=X(J-1,1)+DXX*(1.0+E)**(J-2)
72        Y(J,1)=0.0
73        WB(J)=WBJ
74    600 CONTINUE
75        RETURN
76        END
```

RGRIDD - EPSIL

```
*DECK EPSIL
      FUNCTION EPSIL(FMX,FMIN,DFM,NPT,FPCC,ICC,KEY,NCALL)
C        THIS SUBROUTINE APPLIES A NEWTON-RAPHSON ROOT-FINDING
C        TECHNIQUE TO FIND A VALUE OF EPSILON FOR A PARTICULAR USE
C        OF THE EXPONENTIAL STRECHING TRANSFORMATION.
      DIMENSION R(40)
      FMXL=FMX
      FMINL=FMIN
      DFML=DFM
      FPCCL=FPCC
      ICCL=ICC
      GO TO (1,2),KEY
1     FNPTM2=NPT-2
      IF(NCALL.EQ.1)  EPS=(FMXL/DFML)**(1.0/FNPTM2)-1.0
      DO 3 NIT=1,ICCL
      EP1=EPS+1.0
      EP1TN=EP1**FNPTM2
      REPS=1.0/EPS
      DFMOE=DFML*REPS
      F=FMXL-FMINL-DFMOE*(EP1TN*EP1-1.0)
      IF(ABS(F).LT.FPCCL)  GO TO 4
      DFMOE2=DFMOE*REPS
      FPN=DFMOE2*(1.0+EP1TN*(EPS*FNPTM2-1.0))
      EPS=EPS+F/FPN
3     CONTINUE
      GO TO 5
2     NPTM=NPT-1
      IF(NCALL.EQ.1)
     !  EPS=((FMXL/DFML)**(1.0/(NPT-2))-1.0)*SQRT(FLOAT(NPTM))
      DO 6 L=1,NPTM
6     R(L)=1.0/SQRT(FLOAT(L))
      DO 7 NIT=1,ICCL
      SUM1=0.0
      SUM2=0.0
      DO 8 L=1,NPTM
      FLM2=L-2
      FACT1=1.0+EPS*R(L)
      FACT2=FACT1**FLM2
      SUM1=SUM1+FACT2*FACT1
8     SUM2=SUM2+(L-1)*FACT2*R(L)
      F=FMXL-FMINL-DFML*SUM1
      IF(ABS(F).LT.FPCCL)  GO TO 4
      FPN=DFML*SUM2
      EPS=EPS+F/FPN
7     CONTINUE
5     EPSIL=EPS
      WRITE(6,100)
      RETURN
4     EPSIL=EPS
      WRITE(6,101)  EPSIL,F,NIT
      RETURN
100   FORMAT(/42H EXCEEDED MAX. NO. OF ITERATIONS IN EPSIL.)
101   FORMAT(/7H EPSIL=,F12.5,5X,7H AND F=,F12.5,5X,7H AFTER ,I3,
     *  12H ITERATIONS.)
      END
```

RGRIDD - FCT

```
1  *DECK FCT
2        SUBROUTINE FCT(A,B,XN,IW,X,Y)
3        IF(IW.EQ.1) Y=B*(1.0-(X/A)**XN)**(1.0/XN)
4        IF(IW.EQ.2) X=A*(1.0-(Y/B)**XN)**(1.0/XN)
5        RETURN
6        END
```

```
      *DECK FILLN
            SUBROUTINE FILLN(JMAX,JOMAX,KMAX,KOMAX,WB,WT,WOET,X,IW)
            DIMENSION X(40,40),A(40),B(40),C(40),D(40),F(40),WB(40),WT(40),
           1                                                        WOET(40)
            JMM=JOMAX-1
            KMM=KOMAX-1
            DO 500 K=2,KMM
            J1=2
            IF((KOMAX.GT.KMAX.AND.K.LE.KMAX+1).OR.IW.LT.0) J1=JMAX+2
            DO 100 J=J1,JMM
            WK2=.5*(WB(J)+(K-1)*(WT(J)-WB(J))/KMM)
            IF(JOMAX.GT.JMAX.AND.J.LE.JMAX+1) WK2=.5*(WOET(J)+(K-KMAX-1)*
           1                                        (WT(J)-WOET(J))/(KMM-KMAX))
            A(J)=(1.0-WK2)
            B(J)=-2.0
            C(J)=(1.0+WK2)
            F(J)=0.0
        100 CONTINUE
            F(J1)=-A(J1)*X(J1-1,K)
            IF(IABS(IW).EQ.2) F(J1)=-A(J1)*X(K,J1-1)
            F(JMM)=-C(JMM)*X(JOMAX,K)
            IF(IW.EQ.2) F(JMM)=-C(JMM)*X(K,JOMAX)
            CALL TRIB(A,B,C,D,F,J1,JMM)
            IF(IABS(IW).EQ.2) GO TO 300
            DO 200 J=J1,JMM
        200 X(J,K)=F(J)
            GO TO 500
        300 DO 400 J=J1,JMM
        400 X(K,J)=F(J)
        500 CONTINUE
            RETURN
            END
```

```
      *DECK INPUT
            SUBROUTINE INPUT(X,Y,JMAX,KMAX,JOMAX,KOMAX,MAXIT,NCASE,XN,XNO,
           1IPIN,XMAX,XOMIN,XOMAX,YMAX,YOMIN,YOMAX,DX1,DXO1,DY1,DYO1,DS1,DSO1,
           2                 OMEGA,IB,IBLOUP,IWRITE,IPRINT,XVAL,ITITLE,ISTOP)
      C     THE CARTESIAN COORDINATES OF THE NOZL3D CODE ARE X,Y, AND Z.
      C     X IS ORIENTED IN THE GENERAL STREAMWISE DIRECTION.  IN THIS CODE-
      C     RGRIDD- X AND Y ARE THE EQUIVALENT OF THE Y AND Z CARTESIAN COORDINATES
      C     IN THE NOZL3D CODE.
      C     JMAX,KMAX ARE # OF POINTS IN X,Y DIRECTION OF INTERIOR NOZZLE GRID
      C     JOMIN,JOMAX,KOMIN,KOMAX ARE INDEX LIMITS OF OUTER GRID
      C     MAXIT=MAX NUMBER OF ITERATIONS IN RELAX
      C     NCASE=1(2) MEANS CALCULATE GRID FOR INSIDE(AND OUTSIDE) OF NOZZLE
      C     XN(XNO) IS THE SUPER ELLIPSE NUMBER FOR THE INSIDE(OUTSIDE)
      C     SURFACE OF THE NOZZLE WALL
      C     IPIN=0(1) DO NOT(DO) PLOT INITIAL CONDITIONS
      C     XMAX,YMAX= SEMIAXES A,B OF SUPER ELLIPSE FOR NOZZLE INTERIOR WALL
      C     XOMIN,YOMIN= SEMIAXES A,B OF SUPER ELLIPSE FOR NOZZLE OUTER WALL
      C     XOMAX(YOMAX)=X(Y) COORDINATE OF OUTSIDE LIMITS OF GRID ALONG X(Y) AXIS
      C     XVAL= LOCATION OF THE NOZL3D X COORDINATE (FOR OUTPUT PURPOSES ONLY)
      C     XVAL REPRESENTS THE NOZL3D STREAMWISE X STATION AT WHICH THE
      C     CROSS SECTIONAL GRID IS GENERATED
      C     DX1(DY1)=DX(DY) OF GRID NEAREST INNER NOZZLE WALL
      C     DXO1(DYO1)=DX(DY) OF GRID NEAREST OUTER NOZZLE WALL
      C     DS1(DSO1)=DELTA ARC LENGTH AT CORNER FOR INSIDE(OUTSIDE) SUPER ELLIPSE
      C     OMEGA=OVER-RELAXATION FACTOR
      C     IB(I)=0(1)(2)  DONT(DO) READ IN THE GRID POINTS ON THE ITH BOUNDRY
      C                    (DISTRIBUTE PTS ON IB(3) & IB(4) TO CONFORM TO THE
      C                    DISTRIBUTION ON IB(6,7) & IB(2,8))
      C     IB(1) = 4  MEANS DO ELLIPSE TEST CASE
      C
      C                                IB(4)
      C
      C  YOMAX        ---------------------------------------------
      C               |                                           |
      C               |                                           |
      C               |                                           |
      C               |                                           |
      C               |                                           |
      C               |                                           |
      C         IB(6) |                                           |
      C               |                                           |
      C               |                                           |
      C               |                                           |
      C               |                                           |
      C               |                                           |
      C               |                                           |
      C               |                                           |
      C               |         IB(8)                             |
      C   YOMIN       |----------------------                     | IB(3)
      C    YMAX       |---------------------|                     |
      C               |         IB(10)      ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C         IB(5) |               IB(9) || IB(7)              |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               |                     ||                    |
      C               ---------------------------------------------
      C               0                XMAX XOMIN               XOMAX
      C
      C                         IB(1)               IB(2)
      C
      C     IBLOUP=0(N)  PLOT A BLOW-UP OF N LINES AROUND THE NOZZLE CORNER
      C     IWRITE=0(1) MEANS DONT(DO) WRITE OUT GRID ON UNIT 2
      C     IPRINT=0(1) MEANS DONT(DO) PRINT OUT GRID
      C     ITITLE=TITLE
      C     ISTOP=0(1) MEANS READ(DONT READ) ANOTHER CASE
            DIMENSION ITITLE(13),X(40,40),Y(40,40),IB(10)
            READ(5,100) ITITLE
        100 FORMAT(13A6)
            WRITE(6,101) ITITLE
        101 FORMAT(1H1,13A6)
            READ(5,200) JMAX,KMAX,JOMAX,KOMAX,MAXIT,NCASE,IPIN,IBLOUP,
           1                                              IWRITE,IPRINT,ISTOP
        200 FORMAT(16I5)
            WRITE(6,201) JMAX,KMAX,JOMAX,KOMAX,MAXIT,NCASE,IPIN,IBLOUP,
           1                                              IWRITE,IPRINT,ISTOP
        201 FORMAT(// 92H     JMAX    KMAX    JOMAX  KOMAX   MAXIT    NCASE
           1  IPIN  IBLOUP  IWRITE  IPRINT  ISTOP  /1618)
            READ(5,300) XMAX,XOMIN,XOMAX,YMAX,YOMIN,YOMAX,XVAL
```

```
            RGRIDD - INPUT
 87     300 FORMAT(8F10.5)
 88         WRITE(6,301) XMAX,XOMIN,XOMAX,YMAX,YOMIN,YOMAX,XVAL
 89     301 FORMAT(//5X,4HXMAX,11X,5HXOMIN,10X,5HXOMAX,10X,4HYMAX
 90        1,11X,5HYOMIN,10X,5HYOMAX,11X,4HXVAL,/8E15.8)
 91         READ(5,300) DX1,DX01,DY1,DY01,DS1,DS01,OMEGA
 92         WRITE(6,302) DX1,DX01,DY1,DY01,DS1,DS01,OMEGA
 93     302 FORMAT(//6X,3HDX1,12X,4HDX01,11X,3HDY1,12X,4HDY01,11X,3HDS1,12X,
 94        14HDS01,12X,5HOMEGA/8E15.8)
 95         READ(5,300) XN,XN0
 96         WRITE(6,303) XN,XN0
 97     303 FORMAT(//6X,2HXN,13X,3HXN0/2E15.8)
 98         READ(5,200) IB
 99         WRITE(6,400) IB
100     400 FORMAT(//3H IB,1015)
101         JP1=JMAX+1
102         KP1=KMAX+1
103         IF(IB(1).EQ.1) READ(5,300) (X(J,1),Y(J,1),J=1,JMAX)
104         IF(IB(2).EQ.1) READ(5,300) (X(J,1),Y(J,1),J=JP1,JOMAX)
105         IF(IB(3).EQ.1) READ(5,300) (X(JOMAX,K),Y(JOMAX,K),K=1,KOMAX)
106         IF(IB(4).EQ.1) READ(5,300) (X(J,KOMAX),Y(J,KOMAX),J=1,JOMAX)
107         IF(IB(5).EQ.1) READ(5,300) (X(1,K),Y(1,K),K=1,KMAX)
108         IF(IB(6).EQ.1) READ(5,300) (X(1,K),Y(1,K),K=KP1,KOMAX)
109         IF(IB(7).EQ.1) READ(5,300) (X(JP1,K),Y(JP1,K),K=1,KP1)
110         IF(IB(8).EQ.1) READ(5,300) (X(J,KP1),Y(J,KP1),J=1,JP1)
111         IF(IB(9).EQ.1) READ(5,300) (X(JMAX,K),Y(JMAX,K),K=1,KMAX)
112         IF(IB(10).EQ.1)READ(5,300) (X(J,KMAX),Y(J,KMAX),J=1,JMAX)
113         IF(NCASE.EQ.2) RETURN
114         JOMAX=JMAX
115         KOMAX=KMAX
116         XOMAX=XMAX
117         YOMAX=YMAX
118         RETURN
119         END
```

```
            RGRIDD - MAIN
*DECK MAIN
      PROGRAM MAIN(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE2)
      DIMENSION X(40,40),Y(40,40),WL(40),WR(40),WB(40),WT(40),WOL(40),
     !       WOR(40),WOB(40),WOT(40),WOER(40),WOET(40),IB(10),ITITLE(13)
   10 CALL INPUT(X,Y,JMAX,KMAX,JOMAX,KOMAX,MAXIT,NCASE,XN,XNO,IPIN,XMAX,
     !XOMIN,XOMAX,YMAX,YOMIN,YOMAX,DX1,DXO1,DY1,DYO1,DS1,DSO1,OMEGA,IB,
     2                              IBLOUP,IWRITE,IPRINT,XVAL,ITITLE,ISTOP)
      ISW=1
      CALL BDRYS(1,JMAX,1,KMAX,0.0,XMAX,0.0,YMAX,XN,DX1,DY1,DS1,XMAX
     1                              ,YMAX,X,Y,IB,D1,D2,WL,WR,WB,WT,WOER,WOET)
      IF(NCASE.EQ.2) CALL BDRYS(JMAX+1,JOMAX,KMAX+1,KOMAX,XOMIN,XOMAX,
     !YOMIN,YOMAX,XNO,DXO1,DYO1,DSO1,XOMIN,YOMIN,X,Y,IB,D1,D2,WOL,WOR,
     2                                                  WOB,WOT,WOER,WOET)
C     CALL FILL(NCASE,JMAX,JOMAX,KMAX,KOMAX,X,Y)
      CALL FILLN (JMAX,JMAX,KMAX,KMAX,WB,WT,WOET,X,1)
      CALL FILLN (KMAX,KMAX,JMAX,JMAX,WL,WR,WOER,Y,2)
      IF(NCASE.EQ.2) CALL FILLN(JMAX,JOMAX,KMAX,KOMAX,WOB,WOT,WOET,X
     1   ,1)
      IF(NCASE.EQ.2) CALL FILLN(KMAX,KOMAX,JMAX,JOMAX,WOL,WOR,
     1  WOER,Y,2)
      ITITLE(5)=6HINITIA
      ITITLE(6)=6HL COND
      ITITLE(7)=6HITIONS
      IF(IPIN.EQ.1) CALL PLAWT(JOMAX,KOMAX,X,Y,XOMAX,0.0,YOMAX,0.0
     1       ,XNO,DY1,DX1,DYO1,DXO1,DS1,ITITLE,JMAX,KMAX,XN,JOMAX,KOMAX)
      CALL RELAX(JMAX,KMAX,JMAX,KMAX,X,Y,OMEGA,MAXIT,WB,WT,WL,WR,WOER,
     1                                                            WOET)
C     CALL RELAXS(JMAX,KMAX,X,Y,OMEGA,MAXIT,WL,WR,WB,WT)
      IT4=4*MAXIT
      IF(ISW.EQ.-1) IT4=MAXIT
      IF(NCASE.EQ.2) CALL RELAX(JMAX,KMAX,JOMAX,KOMAX,X,Y,OMEGA,IT4,
     1                                          WOB,WOT,WOL,WOR,WOER,WOET)
      ITITLE(5)=6H FINAL
      ITITLE(6)=6H GRID
      ITITLE(7)=6H
      CALL PLAWT(JOMAX,KOMAX,X,Y,XOMAX,0.,YOMAX,0.
     1     ,XNO,DY1,DX1,DYO1,DXO1,DS1,ITITLE,JMAX,KMAX,XN,JOMAX,KOMAX)
      IF(IWRITE.EQ.1) WRITE(2)XVAL,((X(J,K),Y(J,K),J=1,JOMAX),K=1,KOMAX)
      IF(IPRINT.EQ.1) CALL OUTPUT(X,Y,JOMAX,KOMAX,XVAL)
C     IF(NCASE.EQ.2) GO TO 100
C     CALL CLUSTR(JMAX,X,Y,D1,D2,KMAX)
C     ITITLE(5)=6HEXPONE
C     ITITLE(6)=6HNTIALL
C     ITITLE(7)=6HY CLUS
C     ITITLE(8)=6HTERRED
C     ITITLE(9)=6H GRID
C     CALL PLAWT(JOMAX,KOMAX,X,Y,XOMAX,0.0,YOMAX,0.0
C    !       ,XNO,DY1,DX1,DYO1,DXO1,DS1,ITITLE,JMAX,KMAX,XN,JOMAX,KOMAX)
C 100 CONTINUE
      IF(IBLOUP.GT.0)CALL PLOTBU(JOMAX,KOMAX,X,Y,XNO,XN,DY1,DX1,DYO1,DXO1
     1                                          ,DS1,ITITLE,JMAX,KMAX,IBLOUP)
      IF(ISTOP.EQ.0) GO TO 10
      CALL EOFTV
      STOP
      END
```

```
                RGRIDD - OUTER
*DECK OUTER
      SUBROUTINE OUTER(XMAX,XMIN,YMAX,YMIN,XORG,ETAC,BETA,JMAX,KMAX,X,Y)
C
C       THIS SUBROUTINE PLACES POINTS ON BOTTOM-FRONT-TOP BOUNDARY IN
C       ANGULAR FASHION.
C
      DIMENSION X(40,40),Y(40,40)
C
      LOGICAL CLUSTR
C
      DATA PI/3.141592654/
C
      SINH(X)=0.5*(EXP(X)-EXP(-X))
C
      ETARU=ATAN2(YMAX,XMAX-XORG)
      ETARL=ATAN2(-YMIN,XMAX-XORG)
      DETA=(2.0*PI-(ETARU+ETARL))/(JMAX-1)
      CLUSTR = .FALSE.
      IF( BETA.GT.0.0) CLUSTR = .TRUE.
      IF(.NOT. CLUSTR) GO TO 14
      FACT=PI/(2.0*PI-(ETARU+ETARL))
      FACTR=1.0/FACT
      ETACT=(ETAC-ETARU)*FACT
      B=0.5*ALOG((1.+(EXP(BETA)-1.)*ETACT/PI)/(1.+(EXP(-BETA)-1.)*
     1  ETACT/PI))
      RSB = 1./SINH(B)
14    ETA=ETARU
      ANG1=ATAN2(YMAX,XMIN-XORG)
      ANG2=ATAN2(YMIN,XMIN-XORG)+2.0*PI
      NSIDE = 1
C
      ETARUD=ETARU*180./PI
      ETARLD=ETARL*180./PI
      ANG1D=ANG1*180./PI
      ANG2D=ANG2*180./PI
      WRITE(6,109)  CLUSTR,ETARUD,ETARLD,ANG1D,ANG2D
      IF(CLUSTR.AND.ETAC.LT.ETARU.OR.CLUSTR.AND.ETAC.GT.(2.0*PI-ETARL))
     1  GO TO 22
C
      DO 9 JJ=2,JMAX
      J=JMAX+1-JJ
      ETA = ETA + DETA
      IF(.NOT.CLUSTR)  GO TO 26
      ETAT=(ETA-ETARU)*FACT
      PHIT=ETACT*(SINH(BETA*ETAT/PI-B)*RSB+1.)
      PHI=ETARU+PHIT*FACTR
      GO TO 27
26    PHI=ETA
C
27    GO TO (1,2,3),NSIDE
1     IF(PHI.GT.ANG1)  NSIDE=2
      GO TO 3
2     IF(PHI.GT.ANG2)  NSIDE=3
C
3     GO TO (10,11,12),NSIDE
   10 Y(J,KMAX) = YMAX
      X(J,KMAX) = YMAX/TAN(PHI) + XORG
      GO TO 21
   11 X(J,KMAX) = XMIN
      Y(J,KMAX) = ( XMIN - XORG)*TAN(PHI)
      GO TO 21
12    X(J,KMAX)=XORG+YMIN/TAN(PHI)
      Y(J,KMAX)=YMIN
21    CONTINUE
C
      ETAD=ETA*180./PI
      PHID=PHI*180./PI
      WRITE(6,113)  J,KMAX,X(J,KMAX),J,KMAX,Y(J,KMAX),ETAD,PHID,NSIDE
    9 CONTINUE
C
      RETURN
C
22    WRITE(6,114)
      STOP
C
109   FORMAT(/8H CLUSTR=,L1,5X,6HETARU=,F8.2,5X,6HETARL=,F8.2,5X,
     1  5HANG1=,F8.2,5X,5HANG2=,F8.2//24H OUTER BOUNDARY ON TOP, ,
     2 18HFRONT, AND BOTTOM&)
113   FORMAT(3H X(,I3,1H,,I3,2H)=,F12.5,5X,2HY(,I3,1H,,I3,2H)=,F12.5,
     1  5X,4HETA=,F8.2,5X,4HPHI=,F8.2,5X,6HNSIDE=,I1)
114   FORMAT(/23H ERROR EXIT.  BAD ETAC.)
C
      END
```

RGRIDD - OUTPUT

```
1  *DECK OUTPUT
2        SUBROUTINE OUTPUT(X,Y,JMAX,KMAX,XVAL)
3        DIMENSION X(40,40),Y(40,40)
4        WRITE(6,100) XVAL
5      100 FORMAT(1H1,5X,3HX =,F10.5///5X,7HY ARRAY/)
6        IF(JMAX.LE.20) GO TO 400
7        WRITE(6,200) ((X(J,K),J=1,JMAX),K=1,KMAX)
8      200 FORMAT(20F6.3/3X,20F6.3)
9        WRITE(6,300)
10     300 FORMAT(///5X,7HZ ARRAY)
11       WRITE(6,200) ((Y(J,K),J=1,JMAX),K=1,KMAX)
12       RETURN
13     400 WRITE(6,500) ((X(J,K),J=1,JMAX),K=1,KMAX)
14     500 FORMAT(20F6.3)
15       WRITE(6,300)
16       WRITE(6,500) ((Y(J,K),J=1,JMAX),K=1,KMAX)
17       RETURN
18       END
```

```
      *DECK PLAWT
            SUBROUTINE PLAWT(N,M,X,Y,XMAX,XMIN,YMAX,YMIN,XNN,DY1,DX1,
           1             DY01,DX01,DS1,ITITLE,JMAX,KMAX,XN1,JOMAX,KOMAX)
      C
      C        THIS SUBROUTINE IS ONE OF THE SUBROUTINES THAT PLOTS GRIDS
      C        ON THE SC4020 PLOTTER.
      C
            COMMON/PLOTC/SING
            DIMENSION X(40,40),Y(40,40),XX(40),YY(40),TIT(15),ITITLE(13)
      C
      C        READJUST PLOT LIMITS SO AS TO AVIOD A STRECHED PLOT.
            IW=1
            IF(JOMAX.GT.JMAX.AND.KOMAX.EQ.KMAX) IW=0
            XDIF=XMAX-XMIN
            YDIF=YMAX-YMIN
            IF(XDIF.LT.YDIF)  GO TO 4
            XDIFH=XDIF*0.5
            YMID=(YMAX+YMIN)*0.5
            YMX=YMID+XDIFH
            YMN=YMID-XDIFH
            XMX=XMAX
            XMN=XMIN
            GO TO 5
      4     YDIFH=YDIF*0.5
            XMID=(XMAX+XMIN)*0.5
            XMX=XMID+YDIFH
            XMN=XMID-YDIFH
            YMX=YMAX
            YMN=YMIN
      5     CONTINUE
      C
      C        PLOT THE LINES.
            CALL AXIS(XMN,XMX,YMN,YMX,0,0,XMIN,XMAX,YMIN,YMAX)
            CALL TITLE(ITITLE,78)
            ENCODE(63,10,TIT) M,N,XNN,DY1,DX1,DS1
         10 FORMAT(5HKMAX=,I2,6H JMAX=,I2,4H XN=,F5.1,5H DY1=,F8.7,5H DX1=
           1                                                ,F8.7,5H DS1=,F8.7)
            CALL PRINTV(63,TIT,80,950)
            IF(M.EQ.KMAX) GO TO 30
            ENCODE(27,20,TIT) KMAX,JMAX,XN1
         20 FORMAT(6HKIMAX=,I2,7H JIMAX=,I2,5H XN1=,F5.1)
            CALL PRINTV(27,TIT,150,925)
         30 DO1J=1,M
            MAX=JMAX
            IF(J.GT.KMAX.OR.IW.EQ.0) MAX=N
      1     CALL PLOT(X(1,J),Y(1,J),N,0,MAX)
            DO2I=1,N
            DO3J=1,M
            XX(J)=X(I,J)
          3 YY(J)=Y(I,J)
            MAX=KMAX
            IF(I.GT.JMAX) MAX=M
      2     CALL PLOT(XX,YY,M,0,MAX)
            IF(SING.LE.0.0) RETURN
            IX1=IXV(X(JMAX,1))
            IY1=IYV(Y(JMAX,1))
            CALL LINEV(IX1,IY1-15,IX1,IY1)
            CALL LINEV(IX1,IY1-15,IX1,IY1)
            RETURN
            END
```

```
            RGRIDD - PLOT
 1  *DECK PLOT
 2        SUBROUTINE PLOT(X,Y,NBR,NSYM,MAX)
 3  C
 4  C        THIS SUBROUTINE IS ONE OF THOSE THAT PLOTS GRIDS
 5  C        ON THE SC4020 PLOTTER.
 6  C
 7        DIMENSION X(1),Y(1),MARKPT(5)
 8        DATA MARKPT /42,16,55,38,44/
 9  C     SYMBOLS ARE, IN ORDER&  . + X O *
10        IF (NSYM .GT. 0 .AND. NSYM .LE. 5) GO TO 100
11        J=IABS(NBR)-1
12        DO 110 I=1,J
13        IF(I.EQ.MAX) GO TO 110
14             CALL LINEV( IXV(X(I)), IYV(Y(I)), IXV(X(I+1)),IYV(Y(I+1)) )
15   110  CONTINUE
16        RETURN
17   100  CALL APLOTV(NBR,X,Y,1,1,1,MARKPT(NSYM))
18        RETURN
19        END
```

```
          RGRIDD - PLOTBU
*DECK PLOTBU
      SUBROUTINE PLOTBU(JOMAX,KOMAX,X,Y,XNO,XN,DY1,DX1,DYO1,DXO1,DS1,
     1                                                ITITLE,JMAX,KMAX,IBLOUP)
      DIMENSION X(40,40),Y(40,40),ITITLE(1)
      IF(JMAX.EQ.JOMAX) GO TO 100
      IBH=IBLOUP/2
      J1=JMAX-IBH+1
      J2=JMAX+IBH
      K1=KMAX-IBH+1
      K2=KMAX+IBH
      MAXJ=IBH
      MAXK=IBH
      GO TO 200
  100 J1=MAXO(JMAX-2*IBH+1,1)
      J2=JMAX
      K1=MAXO(KMAX-2*IBH+1,1)
      K2=KMAX
      MAXJ=JMAX
      MAXK=KMAX
  200 JJ=0
      XMIN=1.0E36
      YMIN=1.0E36
      XMAX=-1.0E36
      YMAX=-1.0E36
      DO 300 J=J1,J2
      JJ=JJ+1
      KK=0
      DO 300 K=K1,K2
      KK=KK+1
      X(JJ,KK)=X(J,K)
      Y(JJ,KK)=Y(J,K)
      XMIN=AMIN1(XMIN,X(JJ,KK))
      XMAX=AMAX1(XMAX,X(JJ,KK))
      YMIN=AMIN1(YMIN,Y(JJ,KK))
      YMAX=AMAX1(YMAX,Y(JJ,KK))
  300 CONTINUE
      ITITLE(5)=6HBLOWUP
      ITITLE(6)=6H OF MO
      ITITLE(7)=6HST CON
      ITITLE(8)=6HGESTED
      ITITLE(9)=6H AREA
      CALL PLAWT(JJ,KK,X,Y,XMAX,XMIN,YMAX,YMIN,XNO,DY1,DX1,
     1                  DYO1,DXO1,DS1,ITITLE,MAXJ,MAXK,XN,JOMAX,KOMAX)
      RETURN
      END
```

```
          RGRIDD - RELAX
*DECK RELAX
      SUBROUTINE RELAX(JMAX,KMAX,JOMAX,KOMAX,X,Y,OMEGA,MAXIT,WB,WT,WL,WR
     1                                                    ,WOER,WOET)
C        THIS SUBROUTINE SOLVES BY SLOR THE DIFFERENTIAL EQUATIONS BASED
C        ON A MODIFIED THOMPSON-THAMES-MASTIN S METHOD OF GENERATING GRIDS.
C     THE MODIFICATION EMPLOYS SPECIALIZED SOURCE TERMS INVOLVING FREE
C     PARAMETERS WP AND WQ THAT ARE COMPUTED FROM THE BOUNDARY VALUES.
      DIMENSION X(40,1),WB(1),WT(1),WL(1),WR(1),WOER(1),WOET(1),Y(40,1)
      DIMENSION A(40),B(40),C(40),D(40),F(40),G(40)
      IW=1
      IF(JOMAX.GT.JMAX.AND.KOMAX.EQ.KMAX) IW=0
      KMM=KOMAX-1
      JMM=JOMAX-1
      ICOUNT=0
2     ICOUNT=ICOUNT+1
      RSUM=0.
      RXSUM=0.0
      RYSUM=0.0
      DO 1 K=2,KMM
      J1=2
      IF((KOMAX.GT.KMAX.AND.K.LE.KMAX+1).OR.IW.EQ.0) J1=JMAX+2
      DO 3 J=J1,JMM
      XXD=(X(J+1,K)-X(J-1,K))*0.5
      XED=(X(J,K+1)-X(J,K-1))*0.5
      YXD=(Y(J+1,K)-Y(J-1,K))*0.5
      YED=(Y(J,K+1)-Y(J,K-1))*0.5
      AD=XED**2+YED**2
      BD=XXD*XED+YXD*YED
      GD=XXD**2+YXD**2
      XXED=(X(J+1,K+1)-X(J+1,K-1)-X(J-1,K+1)+X(J-1,K-1))*0.25
      YXED=(Y(J+1,K+1)-Y(J+1,K-1)-Y(J-1,K+1)+Y(J-1,K-1))*0.25
      BD=-2.0*BD
      WQ=.5*(WL(K)+(J-1.0)*(WR(K)-WL(K))/JMM)
      WP=.5*(WB(J)+(K-1.0)*(WT(J)-WB(J))/KMM)
      IF(JOMAX.EQ.JMAX.OR.IW.EQ.0) GO TO 20
      IF(J.LE.JMAX+1)WP=.5*(WOET(J)+(K-KMAX-1)*(WT(J)-WOET(J))/(KMM-KMAX
     1                                                          ))
      IF(K.LE.KMAX+1)WQ=.5*(WOER(K)+(J-JMAX-1)*(WR(K)-WOER(K))/(JMM-JMAX
     1                                                          ))
   20 A(J)=AD*(1.0-WP)
      B(J)=-AD-AD-GD-GD
      C(J)=AD*(1.0+WP)
      F(J)=-BD*XXED-GD*((1.0+WQ)*X(J,K+1)+(1.0-WQ)*X(J,K-1))
3     G(J)=-BD*YXED-GD*((1.0+WQ)*Y(J,K+1)+(1.0-WQ)*Y(J,K-1))
      F(J1)=F(J1)-A(J1)*X(J1-1,K)
      G(J1)=G(J1)-A(J1)*Y(J1-1,K)
      F(JMM)=F(JMM)-C(JMM)*X(JOMAX,K)
      G(JMM)=G(JMM)-C(JMM)*Y(JOMAX,K)
      CALL TRIB(A,B,C,D,F,J1,JMM)
      CALL TRIB(A,B,C,D,G,J1,JMM)
      DO 4 J=J1,JMM
      XC=OMEGA*(F(J)-X(J,K))
      YC=OMEGA*(G(J)-Y(J,K))
      RSUM=RSUM+ABS(XC)+ABS(YC)
      RXSUM=RXSUM+ABS(XC)
      RYSUM=RYSUM+ABS(YC)
      X(J,K)=X(J,K)+XC
4     Y(J,K)=Y(J,K)+YC
    1 CONTINUE
      WRITE(6,100)RSUM,RXSUM,RYSUM,ICOUNT
      IF(ICOUNT.LT.MAXIT)  GO TO  2
      RETURN
100   FORMAT(29H SUM OF RESIDUALS (X+Y),X,Y = ,3F20.10,
     1 7H AFTER ,I5,12H ITERATIONS.)
      END
```

```
                RGRIDD - ROB
  1  *DECK ROB
  2        SUBROUTINE ROB(X,Y,WR,JMIN,JMAX,KMIN,KMAX,YMAX)
  3        DIMENSION X(40,40),Y(40,40)
  4        YM=.5*(Y(1,KMIN+1)+Y(JMIN,KMIN))
  5        DYMB=Y(JMIN,KMIN)-Y(JMIN,KMIN-1)
  6        DYMT=Y(1,KMIN+1)-Y(1,KMIN)
  7        DYM=.5*(DYMB+DYMT)
  8        Y(JMAX,KMIN)=YM
  9        X(JMAX,KMIN)=X(JMAX,1)
 10        Y(JMAX,KMIN-1)=YM-DYM
 11        X(JMAX,KMIN-1)=X(JMAX,1)
 12        Y(JMAX,KMIN+1)=YM+DYM
 13        X(JMAX,KMIN+1)=X(JMAX,1)
 14        Y(JMAX,KMAX)=YMAX
 15        X(JMAX,KMAX)=X(JMAX,1)
 16        DYM=1.1*DYM
 17        E=EPSIL(Y(JMAX,KMAX)-Y(JMAX,KMIN+1),0.,DYM,KMAX-KMIN,.001,100,1,1)
 18        K1=KMIN+2
 19        KMAXM1=KMAX-1
 20        DO 100 K=K1,KMAXM1
 21        X(JMAX,K)=X(JMAX,1)
 22      100 Y(JMAX,K)=Y(JMAX,K-1)+DYM*(1.0+E)**(K-K1)
 23        E=EPSIL(Y(JMAX,KMIN-1)-Y(JMAX,1),0.0,DYM,KMIN-1,.001,100,1,1)
 24        K2=KMIN-2
 25        DO 200 KK=2,K2
 26        K=K2-KK+2
 27        X(JMAX,K)=X(JMAX,1)
 28      200 Y(JMAX,K)=Y(JMAX,K+1)-DYM*(1.0+E)**(K2-K)
 29        CALL WCALC(X,Y,WR,JMAX,JMAX,2,KMAXM1)
 30        RETURN
 31        END
```

```
            RGRIDD - SLOPE
 1  *DECK SLOPE
 2        SUBROUTINE SLOPE(A,B,XN,X2,Y2)
 3        JS=1000
 4        DX=A/(JS-1.0)
 5        X1=0.0
 6        Y1=B
 7        DO 100 J=2,JS
 8        X2=(J-1)*DX
 9        CALL FCT(A,B,XN,1,X2,Y2)
10        S=(Y2-Y1)/(X2-X1)
11        IF(S.LT.-1.0) RETURN
12        X1=X2
13        Y1=Y2
14     100 CONTINUE
15        WRITE(6,200)
16     200 FORMAT(5X,27HSTOPPED IN SUBROUTINE SLOPE )
17        STOP
18        END
```

```
            RGRIDD - TITLE
*DECK TITLE
      SUBROUTINE TITLE(ITITLE,NCHARS)
C
C        THIS SUBROUTINE IS ONE OF THOSE THAT PLOTS GRIDS
C        ON THE SC4020 PLOTTER.
C
C     THE MAXIMUM NUMBER OF CHARACTERS ALLOWED IN THE TITLE IS 108.
C
      ICHARS=IABS(NCHARS)
      IF (ICHARS .GT. 108) ICHARS=108
      IF (ICHARS .GT. 54) IX=14
      IF (ICHARS .LE. 54) IX=510-(ICHARS/2)*18
      IY=990
      CALL RITE2V(IX,IY,1010,90,1,ICHARS,1,ITITLE,NLAST)
      RETURN
      END
```

```
*DECK TOB
      SUBROUTINE TOB(X,Y,WT,JMIN,JMAX,KMIN,KMAX)
      DIMENSION X(40,40),Y(40,40)
      XM=.5*(X(JMIN+1,1)+X(JMIN,KMIN))
      DXMB=X(JMIN,KMIN)-X(JMIN-1,KMIN)
      DXMT=X(JMIN+1,1)-X(JMIN,1)
      DXM=.5*(DXMB+DXMT)
      X(JMIN,KMAX)=XM
      Y(JMIN,KMAX)=Y(1,KMAX)
      X(JMIN-1,KMAX)=XM-DXM
      Y(JMIN-1,KMAX)=Y(1,KMAX)
      X(JMIN+1,KMAX)=XM+DXM
      Y(JMIN+1,KMAX)=Y(1,KMAX)
      DXM=1.1*DXM
      E=EPSIL(X(JMAX,KMAX)-X(JMIN+1,KMAX),0.,DXM,JMAX-JMIN,.001,100,1,1)
      J1=JMIN+2
      JMAXM1=JMAX-1
      DO 100 J=J1,JMAXM1
      X(J,KMAX)=X(J-1,KMAX)+DXM*(1.0+E)**(J-J1)
  100 Y(J,KMAX)=Y(1,KMAX)
      E=EPSIL(X(JMIN-1,KMAX)-X(1,KMAX),0.0,DXM,JMIN-1,.001,100,1,1)
      J2=JMIN-2
      DO 200 JJ=2,J2
      J=J2-JJ+2
      X(J,KMAX)=X(J+1,KMAX)-DXM*(1.0+E)**(J2-J)
  200 Y(J,KMAX)=Y(1,KMAX)
      CALL WCALC(X,Y,WT,2,JMAX-1,KMAX,KMAX)
      RETURN
      END
```

```
                RGRIDD - TRIB
*DECK TRIB
      SUBROUTINE TRIB(A,B,C,X,F,NL,NU)
      DIMENSION A(2),B(2),C(2),X(2),F(2)
C
C        THIS SUBROUTINE SOLVES A TRI-DIAGONAL SYSTEM OF LINEAR
C        EQUATIONS.
C
      X(NL)=C(NL)/B(NL)
      F(NL)=F(NL)/B(NL)
      NLP1 = NL +1
      DO 1 J=NLP1,NU
      Z=1./(B(J)-A(J)*X(J-1))
      X(J)=C(J)*Z
1     F(J)=(F(J)-A(J)*F(J-1))*Z
      NUPNL=NU+NL
      DO 2 J1=NLP1,NU
      J=NUPNL-J1
2     F(J)=F(J)-X(J)*F(J+1)
      RETURN
      END
```

```
*DECK WCALC
      SUBROUTINE WCALC(X,Y,W,J1,J2,K1,K2)
      DIMENSION X(40,40),Y(40,40),W(1)
      IF(J1.EQ.J2) GO TO 200
      DO 100 J=J1,J2
      T=X(J+1,K1)-X(J-1,K1)
      T2=Y(J+1,K1)-Y(J-1,K1)
      W(J)=-2.0*(T*(X(J+1,K1)-2.0*X(J,K1)+X(J-1,K1))+
     1          T2*(Y(J+1,K1)-2.0*Y(J,K1)+Y(J-1,K1)))/(T**2+T2**2)
  100 CONTINUE
      RETURN
  200 DO 300 K=K1,K2
      T=Y(J1,K+1)-Y(J1,K-1)
      T2=X(J1,K+1)-X(J1,K-1)
      W(K)=-2.0*(T*(Y(J1,K+1)-2.0*Y(J1,K)+Y(J1,K-1))+
     1          T2*(X(J1,K+1)-2.0*X(J1,K)+X(J1,K-1)))/(T**2+T2**2)
  300 CONTINUE
      RETURN
      END
```

```
 1  *DECK XOFS
 2        SUBROUTINE XOFS(DS,X1,DX,A,B,XN,EPSLON)
 3        IF(X1+DX.GE.A) DX=.999999*(A-X1)
 4        H=-.1*DX
 5        CALL ARCLEN(X1,X1+DX,A,B,XN,16,DSDX)
 6        DXP=0.0
 7        DXM=A
 8        IF(DS-DSDX.GT.0.0) DXP=DX
 9        IF(DS-DSDX.LT.0.0) DXM=DX
10        DO 500 I=1,20
11        IF(X1+DX+H.GE.A) H=.9*(A-X1-DX)
12        IF(DX+H.LT.0.0) H=-DX/2.0
13        CALL ARCLEN(X1,X1+DX+H,A,B,XN,16,DSDXPH)
14        D=(DSDXPH-DSDX)/H
15        DX=DX-(DSDX-DS)/D
16        IF(X1+DX.GE.A) DX=.999999*(A-X1)
17        IF(DXP.EQ.0.0.OR.DXM.EQ.A) GO TO 450
18        IF(DX.GE.DXP.OR.DX.LE.DXM) DX=(DXP+DXM)/2.0
19    450 CALL ARCLEN(X1,X1+DX,A,B,XN,16,DSDX)
20        IF(ABS(DS-DSDX)/DS.LT.EPSLON) GO TO 600
21        IF(DS-DSDX.GT.0.0) DXP=AMAX1(DXP,DX)
22        IF(DS-DSDX.LT.0.0) DXM=AMIN1(DXM,DX)
23        H=(DSDX-DS)/D
24    500 CONTINUE
25        WRITE(6,550) X1,DX,H,D,DSDX,DSDXPH,DS,DXP,DXM,A
26    550 FORMAT(5X,26HSTOPPED IN SUBROUTINE XOFS /10E13.7)
27        STOP
28    600 X1=X1+DX
29        RETURN
30        END
```

APPENDIX D

COMPLETE NOZL3D PRINTED OUTPUT FOR THE TEST CASES

PRINTED OUTPUT FOR TEST CASE NO. 1

NMAX	JMAX	KMAX	LMAX	LAMIN	INVISC	J1BC	JMAXBC	KPLANE	K1BC	JK1WL	JK1WU	KW	JKW	KMAXBC
200	15	5	15	1	0	0	1	1	1	0	0	0	0	3

L1BC	JL1WL	JL1WU	LW	JLW	LMAXBC	NRST	IWRIT	NGRI	NP	KVIS	LVIS	KLVIS	INFLT	ISUTH	NROUT
1	1	15	0	0	2	0	1	0	50	1	1	1	0	0	300

DT	FSMACH	RMACH	RE	PR	RTDEGK	FSP	FST
1.0000000-02	3.0000000+00	3.0000000+00	1.0000000+05	1.0000000+00	3.0000000+02	1.0000000+00	1.0000000+00

GAMMA	RMUEXP	TW	CNBR	DTFAC	RM	SMU	OMEGA
1.4000000+00	1.0000000+00	.0000000	.0000000	1.1000000+00	.0000000	1.0000000-01	.0000000

DTMAX
1.0000000-02

THIS IS A RESTART FROM THE FOLLOWING INITIAL CONDITIONS

KMAXR,JMAXR,LMAXR,ITMAXR,LMAXBR,L1BCR,FSMACR,GAMMAR,RER,SMUR,DTR,ALPR,CNBRR,PRR								
5	15	15	300	2	1			
.30000000+01	.14000000+01	.10000000+06	.50000000+00	.50000000-02	.00000000	.00000000	.10000000+01	

THROAT LOCATION X=0. AT JT= 1

THROAT AREA AT= 6.66203-02

K=1

L	VOU	WOU	HTOT	PTOT
1	.0000000	.0000000	2.8000000+00	9.9999997-01
2	.0000000	3.7922165-03	2.8000000+00	1.0070759+00
3	.0000000	3.7922165-03	2.8000005+00	1.0465822+00
4	.0000000	6.4821022-03	2.8000056+00	1.1871473+00
5	.0000000	1.1146608-02	2.8000486+00	1.6938912+00
6	.0000000	1.7710377-02	2.8002935+00	4.1553235+00
7	.0000000	2.4520904-02	2.8009583+00	1.9078504+01
8	.0000000	2.7132189-02	2.8013223+00	3.6324695+01
9	.0000000	.0000000	2.8000000+00	3.6732722+01
10	.0000000	.0000000	2.8000000+00	3.6732722+01
11	.0000000	.0000000	2.8000000+00	3.6732722+01
12	.0000000	.0000000	2.8000000+00	3.6732722+01
13	.0000000	.0000000	2.8000000+00	3.6732722+01
14	.0000000	.0000000	2.8000000+00	3.6732722+01
15	.0000000	.0000000	2.8000000+00	3.6732722+01

J,K,L, AND MAX COURANT NBR 2 1 1 .61909+02
GF= 1.3405-02 4.9399-03 .0000 -1.5713-01 2.2832-04 CW= 5.0681+00
NC = 0 TIME = .0000 DT = .1000-01

CURRENT FLOW AT NC= 0 AS WRITTEN TO RESTART FILE

J= 1 K= 1	L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
	1	.010000	-.500000	.000000	.357143	.000000	.000000	.C00000	2.8C0000	1.000000	4.226E93
	2	.010000	-.500000	.000089	.357863	.167855	.000000	.C00637	2.7E4365	1.000000	4.214E88
	3	.010000	-.500000	.000226	.361819	.425367	.000000	.C01613	2.7E3813	1.000000	4.150E11
	4	.010000	-.500000	.000436	.375084	.818316	.000000	.C05304	2.6E6072	1.000000	3.946E77
	5	.010000	-.500000	.000758	.415174	1.398878	.000000	.C15593	2.4C8628	1.000000	3.423E57
	6	.010000	-.500000	.001252	.536464	2.163264	.000000	.C38312	1.8E4058	1.000000	2.391E49
	7	.010000	-.500000	.002010	.829016	2.822899	.000000	.C69220	1.2C6249	1.000000	1.300E04
	8	.010000	-.500000	.003172	.996343	2.996940	.000000	.C81314	1.0C3670	1.000000	1.005142
	9	.010000	-.500000	.004956	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	10	.010000	-.500000	.007692	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	11	.010000	-.500000	.011890	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	12	.010000	-.500000	.018330	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	13	.010000	-.500000	.028210	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	14	.010000	-.500000	.043287	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	15	.010000	-.500000	.066620	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00

J= 2 K= 1	L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
	1	.080714	-.500000	.000000	.357143	.000000	.000000	.C00000	2.8C0000	1.000000	4.226E93
	2	.080714	-.500000	.000253	.357863	.167855	.000000	.C00224	2.7E4365	1.000000	4.214E88
	3	.080714	-.500000	.000642	.361819	.425367	.000000	.C00568	2.7E3813	1.000000	4.150E11
	4	.080714	-.500000	.001238	.375084	.818316	.000000	.C01867	2.6E6072	1.000000	3.946E77
	5	.080714	-.500000	.002153	.415174	1.398878	.000000	.C05488	2.4C8628	1.000000	3.423E57
	6	.080714	-.500000	.003557	.536464	2.163264	.000000	.C13485	1.8E4057	1.000000	2.391E49
	7	.080714	-.500000	.005710	.829016	2.822899	.000000	.C24364	1.2C6249	1.000000	1.300E04
	8	.080714	-.500000	.009013	.996343	2.996940	.000000	.C28621	1.0C3670	1.000000	1.005142
	9	.080714	-.500000	.014080	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	10	.080714	-.500000	.021854	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	11	.080714	-.500000	.033781	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	12	.080714	-.500000	.052077	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	13	.080714	-.500000	.080146	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	14	.080714	-.500000	.123208	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	15	.080714	-.500000	.189270	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00

J= 3 K= 1	L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
	1	.151429	-.500000	.000000	.357143	.000000	.000000	.C00000	2.8C0000	1.000000	4.226E93
	2	.151429	-.500000	.000347	.357863	.167855	.000000	.C00164	2.7E4365	1.000000	4.214E88
	3	.151429	-.500000	.000879	.361819	.425367	.000000	.C00415	2.7E3813	1.000000	4.150E11
	4	.151429	-.500000	.001696	.375084	.818316	.000000	.C01363	2.6E6072	1.000000	3.946E77
	5	.151429	-.500000	.002949	.415174	1.398878	.000000	.C04007	2.4C8628	1.000000	3.423E57
	6	.151429	-.500000	.004872	.536464	2.163264	.000000	.C09845	1.8E4058	1.000000	2.391E49
	7	.151429	-.500000	.007821	.829016	2.822899	.000000	.C17788	1.2C6249	1.000000	1.300E04
	8	.151429	-.500000	.012345	.996343	2.996940	.000000	.C20896	1.0C3670	1.000000	1.005142
	9	.151429	-.500000	.019286	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	10	.151429	-.500000	.029934	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	11	.151429	-.500000	.046270	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	12	.151429	-.500000	.071331	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	13	.151429	-.500000	.109777	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	14	.151429	-.500000	.168759	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00
	15	.151429	-.500000	.259245	1.000000	3.000000	.000000	.C00000	1.0C0000	1.000000	1.000C00

J= 4 K= 1	L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
	1	.222143	-.500000	.000000	.357143	.000000	.000000	.C00000	2.8C0000	1.000000	4.226E93

2	.222143	-.500000	.000420	.357863	.167855	.000000	.000135	2.794365	1.000000	4.214E88
3	.222143	-.500000	.001065	.361819	.425367	.000000	.000342	2.763813	1.000000	4.150E11
4	.222143	-.500000	.002054	.375084	.818316	.000000	.001125	2.666072	1.000000	3.946E77
5	.222143	-.500000	.003572	.415174	1.398878	.000000	.003308	2.408628	1.000000	3.423E57
6	.222143	-.500000	.005900	.536464	2.163264	.000000	.008129	1.864058	1.000000	2.391349
7	.222143	-.500000	.009472	.829016	2.822899	.000000	.014686	1.206249	1.000000	1.300204
8	.222143	-.500000	.014952	.996343	2.996940	.000000	.017252	1.003670	1.000000	1.005142
9	.222143	-.500000	.023359	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.222143	-.500000	.036256	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.222143	-.500000	.056041	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.222143	-.500000	.086395	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.222143	-.500000	.132961	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.222143	-.500000	.204399	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.222143	-.500000	.313995	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 5 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.292857	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226E93
2	.292857	-.500000	.000483	.357863	.167855	.000000	.000118	2.794365	1.000000	4.214E88
3	.292857	-.500000	.001223	.361819	.425367	.000000	.000298	2.763813	1.000000	4.150E11
4	.292857	-.500000	.002359	.375084	.818316	.000000	.000880	2.666072	1.000000	3.946E77
5	.292857	-.500000	.004101	.415174	1.398878	.000000	.002881	2.408628	1.000000	3.423E57
6	.292857	-.500000	.006775	.536464	2.163264	.000000	.007080	1.864058	1.000000	2.391349
7	.292857	-.500000	.010876	.829016	2.822899	.000000	.012791	1.206249	1.000000	1.300204
8	.292857	-.500000	.017168	.996343	2.996940	.000000	.015026	1.003670	1.000000	1.005142
9	.292857	-.500000	.026820	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.292857	-.500000	.041628	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.292857	-.500000	.064346	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.292857	-.500000	.099197	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.292857	-.500000	.152664	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.292857	-.500000	.234688	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.292857	-.500000	.360524	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 6 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.363571	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226E93
2	.363571	-.500000	.000538	.357863	.167855	.000000	.000106	2.794365	1.000000	4.214E88
3	.363571	-.500000	.001363	.361819	.425367	.000000	.000268	2.763813	1.000000	4.150E11
4	.363571	-.500000	.002628	.375084	.818316	.000000	.000880	2.666072	1.000000	3.946E77
5	.363571	-.500000	.004570	.415174	1.398878	.000000	.002586	2.408628	1.000000	3.423E57
6	.363571	-.500000	.007549	.536464	2.163264	.000000	.006354	1.864057	1.000000	2.391349
7	.363571	-.500000	.012118	.829016	2.822899	.000000	.011480	1.206249	1.000000	1.300204
8	.363571	-.500000	.019129	.996343	2.996940	.000000	.013486	1.003670	1.000000	1.005142
9	.363571	-.500000	.029883	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.363571	-.500000	.046383	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.363571	-.500000	.071695	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.363571	-.500000	.110527	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.363571	-.500000	.170099	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.363571	-.500000	.261492	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.363571	-.500000	.401700	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 7 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.434286	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226E93
2	.434286	-.500000	.000588	.357863	.167855	.000000	.000097	2.794365	1.000000	4.214E88
3	.434286	-.500000	.001489	.361819	.425367	.000000	.000245	2.763813	1.000000	4.150E11
4	.434286	-.500000	.002873	.375084	.818316	.000000	.000805	2.666072	1.000000	3.946E77
5	.434286	-.500000	.004995	.415174	1.398878	.000000	.002366	2.408628	1.000000	3.423E57
6	.434286	-.500000	.008250	.536464	2.163264	.000000	.005814	1.864057	1.000000	2.391349
7	.434286	-.500000	.013244	.829016	2.822899	.000000	.010504	1.206249	1.000000	1.300204
8	.434286	-.500000	.020906	.996343	2.996940	.000000	.012339	1.003670	1.000000	1.005142

9	.434286	-.500000	.032661	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.434286	-.500000	.050693	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.434286	-.500000	.078357	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.434286	-.500000	.120798	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.434286	-.500000	.185907	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.434286	-.500000	.285793	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.434286	-.500000	.439030	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 8 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.505000	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226893
2	.505000	-.500000	.000634	.357863	.167855	.000000	.000090	2.794365	1.000000	4.214888
3	.505000	-.500000	.001606	.361819	.425367	.000000	.000227	2.763813	1.000000	4.150611
4	.505000	-.500000	.003098	.375084	.818316	.000000	.000746	2.666072	1.000000	3.946577
5	.505000	-.500000	.005386	.415174	1.398878	.000000	.002194	2.408628	1.000000	3.423557
6	.505000	-.500000	.008896	.536464	2.163264	.000000	.005391	1.864057	1.000000	2.391349
7	.505000	-.500000	.014282	.829016	2.822899	.000000	.009741	1.206249	1.000000	1.300204
8	.505000	-.500000	.022544	.996343	2.996940	.000000	.011442	1.003670	1.000000	1.005142
9	.505000	-.500000	.035219	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.505000	-.500000	.054665	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.505000	-.500000	.084496	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.505000	-.500000	.130262	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.505000	-.500000	.200472	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.505000	-.500000	.308183	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.505000	-.500000	.473426	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 9 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.575714	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226893
2	.575714	-.500000	.000677	.357863	.167855	.000000	.000084	2.794365	1.000000	4.214888
3	.575714	-.500000	.001715	.361819	.425367	.000000	.000213	2.763813	1.000000	4.150611
4	.575714	-.500000	.003307	.375084	.818316	.000000	.000699	2.666072	1.000000	3.946577
5	.575714	-.500000	.005751	.415174	1.398878	.000000	.002055	2.408628	1.000000	3.423557
6	.575714	-.500000	.009499	.536464	2.163264	.000000	.005049	1.864058	1.000000	2.391349
7	.575714	-.500000	.015249	.829016	2.822899	.000000	.009123	1.206249	1.000000	1.300204
8	.575714	-.500000	.024071	.996343	2.996940	.000000	.010717	1.003670	1.000000	1.005142
9	.575714	-.500000	.037604	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.575714	-.500000	.058367	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.575714	-.500000	.090218	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.575714	-.500000	.139083	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.575714	-.500000	.214048	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.575714	-.500000	.329054	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.575714	-.500000	.505487	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 10 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.646429	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226893
2	.646429	-.500000	.000717	.357863	.167855	.000000	.000079	2.794365	1.000000	4.214888
3	.646429	-.500000	.001817	.361819	.425367	.000000	.000201	2.763813	1.000000	4.150611
4	.646429	-.500000	.003505	.375084	.818316	.000000	.000660	2.666072	1.000000	3.946577
5	.646429	-.500000	.006094	.415174	1.398878	.000000	.001939	2.408628	1.000000	3.423557
6	.646429	-.500000	.010065	.536464	2.163264	.000000	.004765	1.864058	1.000000	2.391349
7	.646429	-.500000	.016159	.829016	2.822899	.000000	.008609	1.206249	1.000000	1.300204
8	.646429	-.500000	.025506	.996343	2.996940	.000000	.010114	1.003670	1.000000	1.005142
9	.646429	-.500000	.039847	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.646429	-.500000	.061847	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.646429	-.500000	.095599	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.646429	-.500000	.147378	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.646429	-.500000	.226813	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.646429	-.500000	.348677	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.646429	-.500000	.535633	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 11 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.717143	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226893
2	.717143	-.500000	.000755	.357863	.167855	.000000	.000075	2.794365	1.000000	4.214988
3	.717143	-.500000	.001914	.361819	.425367	.000000	.000190	2.763813	1.000000	4.150611
4	.717143	-.500000	.003691	.375084	.818316	.000000	.000626	2.666072	1.000000	3.946577
5	.717143	-.500000	.006418	.415174	1.398878	.000000	.001841	2.408628	1.000000	3.423557
6	.717143	-.500000	.010602	.536464	2.163264	.000000	.004524	1.864057	1.000000	2.391349
7	.717143	-.500000	.017019	.829016	2.822899	.000000	.008174	1.206249	1.000000	1.300204
8	.717143	-.500000	.026865	.996343	2.996940	.000000	.009602	1.003670	1.000000	1.005142
9	.717143	-.500000	.041970	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.717143	-.500000	.065142	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.717143	-.500000	.100692	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.717143	-.500000	.155230	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.717143	-.500000	.238897	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.717143	-.500000	.367254	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.717143	-.500000	.564170	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 12 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.787857	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226893
2	.787857	-.500000	.000792	.357863	.167855	.000000	.000072	2.794365	1.000000	4.214988
3	.787857	-.500000	.002006	.361819	.425367	.000000	.000182	2.763813	1.000000	4.150611
4	.787857	-.500000	.003869	.375084	.818316	.000000	.000598	2.666072	1.000000	3.946577
5	.787857	-.500000	.006727	.415174	1.398878	.000000	.001757	2.408628	1.000000	3.423557
6	.787857	-.500000	.011112	.536464	2.163264	.000000	.004316	1.864058	1.000000	2.391349
7	.787857	-.500000	.017839	.829016	2.822899	.000000	.007798	1.206249	1.000000	1.300204
8	.787857	-.500000	.028159	.996343	2.996940	.000000	.009161	1.003670	1.000000	1.005142
9	.787857	-.500000	.043990	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.787857	-.500000	.068279	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.787857	-.500000	.105540	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.787857	-.500000	.162703	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.787857	-.500000	.250399	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.787857	-.500000	.384935	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.787857	-.500000	.591331	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 13 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.858571	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226893
2	.858571	-.500000	.000826	.357863	.167855	.000000	.000069	2.794365	1.000000	4.214988
3	.858571	-.500000	.002094	.361819	.425367	.000000	.000174	2.763813	1.000000	4.150611
4	.858571	-.500000	.004039	.375084	.818316	.000000	.000572	2.666072	1.000000	3.946577
5	.858571	-.500000	.007025	.415174	1.398878	.000000	.001680	2.408628	1.000000	3.423557
6	.858571	-.500000	.011600	.536464	2.163264	.000000	.004135	1.864058	1.000000	2.391349
7	.858571	-.500000	.018622	.829016	2.822899	.000000	.007470	1.206249	1.000000	1.300204
8	.858571	-.500000	.029395	.996343	2.996940	.000000	.008776	1.003670	1.000000	1.005142
9	.858571	-.500000	.045922	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.858571	-.500000	.071277	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.858571	-.500000	.110174	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.858571	-.500000	.169848	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.858571	-.500000	.261394	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.858571	-.500000	.401839	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.858571	-.500000	.617298	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 14 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.929286	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226893
2	.929286	-.500000	.000860	.357863	.167855	.000000	.000066	2.794365	1.000000	4.214988
3	.929286	-.500000	.002179	.361819	.425367	.000000	.000167	2.763813	1.000000	4.150611
4	.929286	-.500000	.004202	.375084	.818316	.000000	.000550	2.666072	1.000000	3.946577
5	.929286	-.500000	.007306	.415174	1.398878	.000000	.001618	2.408628	1.000000	3.423557
6	.929286	-.500000	.012068	.536464	2.163264	.000000	.003974	1.864058	1.000000	2.391349

7	.929286	-.500000	.019374	.829016	2.822899	.000000	.007181	1.206249	1.000000	1.300204
8	.929286	-.500000	.030582	.996343	2.996940	.000000	.008435	1.003670	1.000000	1.005142
9	.929286	-.500000	.047776	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	.929286	-.500000	.074154	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	.929286	-.500000	.114622	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	.929286	-.500000	.176704	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	.929286	-.500000	.271946	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	.929286	-.500000	.418060	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	.929286	-.500000	.642216	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

J= 15 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.000000	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226893
2	1.000000	-.500000	.000892	.357863	.167855	.000000	.000064	2.794365	1.000000	4.214988
3	1.000000	-.500000	.002260	.361819	.425367	.000000	.000161	2.763813	1.000000	4.150611
4	1.000000	-.500000	.004359	.375084	.818316	.000000	.000530	2.666072	1.000000	3.946577
5	1.000000	-.500000	.007579	.415174	1.398878	.000000	.001559	2.408628	1.000000	3.423557
6	1.000000	-.500000	.012519	.536464	2.163264	.000000	.003831	1.864058	1.000000	2.391349
7	1.000000	-.500000	.020098	.829016	2.822899	.000000	.006922	1.206249	1.000000	1.300204
8	1.000000	-.500000	.031724	.996343	2.996940	.000000	.008131	1.003670	1.000000	1.005142
9	1.000000	-.500000	.049560	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
10	1.000000	-.500000	.076924	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
11	1.000000	-.500000	.118903	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
12	1.000000	-.500000	.183304	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
13	1.000000	-.500000	.282103	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
14	1.000000	-.500000	.433674	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000
15	1.000000	-.500000	.666203	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000000

NC=200 TIME= 2.0000 DT= .1000-01 MAXIMUM DELTAQ/Q= -1.706-05AT J,K,L,N=15, 1, 5, 2
GF= 3.2079-04 4.6633-03 .0000 -1.6968-01 1.1273-04 CW= 5.0681+00

CURRENT FLOW AT NC= 200 AS WRITTEN TO RESTART FILE

J= 1 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.010000	-.500000	.000000	.357143	.000000	.000000	.000000	2.800000	1.000000	4.226E93
2	.010000	-.500000	.000089	.357863	.167855	.000000	.000637	2.794365	1.000000	4.214E88
3	.010000	-.500000	.000226	.361819	.425367	.000000	.001613	2.763813	1.000000	4.150E11
4	.010000	-.500000	.000436	.375084	.818316	.000000	.005304	2.666072	1.000000	3.946E77
5	.010000	-.500000	.000758	.415174	1.398878	.000000	.015593	2.408628	1.000000	3.423E57
6	.010000	-.500000	.001252	.536464	2.163264	.000000	.038312	1.864058	1.000000	2.391E49
7	.010000	-.500000	.002010	.829016	2.822899	.000000	.069220	1.206249	1.000000	1.300E04
8	.010000	-.500000	.003172	.996343	2.996940	.000000	.081314	1.003670	1.000000	1.005142
9	.010000	-.500000	.004956	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000C00
10	.010000	-.500000	.007692	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000C00
11	.010000	-.500000	.011890	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000C00
12	.010000	-.500000	.018330	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000C00
13	.010000	-.500000	.028210	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000C00
14	.010000	-.500000	.043367	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000C00
15	.010000	-.500000	.066620	1.000000	3.000000	.000000	.000000	1.000000	1.000000	1.000C00

J= 2 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.080714	-.500000	.000000	.412761	.000000	.000000	.000000	2.815870	1.162282	4.011742
2	.080714	-.500000	.000253	.413776	.147031	.000000	.000237	2.811531	1.163343	4.001E29
3	.080714	-.500000	.000642	.416311	.342501	.000000	.000898	2.792330	1.162478	3.964E02
4	.080714	-.500000	.001238	.426021	.644745	.000000	.003565	2.732422	1.164068	3.843E30
5	.080714	-.500000	.002153	.453482	1.117190	.000000	.010793	2.565235	1.163289	3.519E79
6	.080714	-.500000	.003557	.547723	1.849216	.000000	.032544	2.128648	1.165909	2.708192
7	.080714	-.500000	.005710	.883527	2.725908	.000000	.085935	1.320577	1.166765	1.387E37
8	.080714	-.500000	.009013	1.119655	2.963187	.000000	.112531	1.045138	1.170194	.998E41
9	.080714	-.500000	.014080	1.114965	2.961983	.000000	.097118	1.045068	1.165213	1.000E53
10	.080714	-.500000	.021854	1.123731	2.957422	.000000	.113900	1.048192	1.177886	1.000405
11	.080714	-.500000	.033781	1.050126	2.981731	.000000	.042705	1.020526	1.071681	1.000754
12	.080714	-.500000	.052077	.994287	3.002504	.000000	-.005309	.997196	.991500	.999484
13	.080714	-.500000	.080146	1.000195	2.999893	.000000	-.001582	1.000276	1.000471	1.000197
14	.080714	-.500000	.123208	1.000250	2.999905	.000000	-.001230	1.000008	1.000258	.999E08
15	.080714	-.500000	.189270	1.000000	3.000000	.000000	-.001997	1.000000	1.000000	1.000C00

J= 3 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.151429	-.500000	.000000	.396005	.000000	.000000	.000000	2.805887	1.111145	4.064338
2	.151429	-.500000	.000347	.405610	.140424	.000000	.000197	2.801962	1.136504	4.019533
3	.151429	-.500000	.000879	.399058	.326490	.000000	.000641	2.784597	1.111215	4.021130
4	.151429	-.500000	.001696	.416271	.612009	.000000	.002712	2.731321	1.136970	3.878129
5	.151429	-.500000	.002949	.430237	1.056361	.000000	.006866	2.583099	1.111344	3.619579
6	.151429	-.500000	.004872	.518684	1.751025	.000000	.021597	2.194151	1.138070	2.853024
7	.151429	-.500000	.007821	.798181	2.655008	.000000	.056487	1.394495	1.113060	1.526077
8	.151429	-.500000	.012345	1.094939	2.961747	.000000	.091563	1.046383	1.145726	1.009101
9	.151429	-.500000	.019286	1.088481	2.972305	.000000	.075769	1.031367	1.122623	.996976
10	.151429	-.500000	.029934	1.123208	2.957920	.000000	.111497	1.048086	1.177218	1.000490
11	.151429	-.500000	.046270	1.101781	2.964716	.000000	.088444	1.040416	1.146310	1.000850
12	.151429	-.500000	.071331	1.015566	2.994191	.000000	.015017	1.006433	1.022100	1.000234
13	.151429	-.500000	.109777	.999691	3.000274	.000000	-.002671	.999932	.999623	1.000055
14	.151429	-.500000	.168759	1.000145	2.999932	.000000	-.001548	.999972	1.000117	.999914
15	.151429	-.500000	.259245	1.000000	3.000000	.000000	-.002417	1.000000	1.000000	1.000000

J= 4 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.222143	-.500000	.000000	.386941	.000000	.000000	.000000	2.805834	1.085691	4.102080
2	.222143	-.500000	.000420	.397741	.137617	.000000	.000135	2.802051	1.114490	4.051697
3	.222143	-.500000	.001065	.389802	.319676	.000000	.000433	2.785320	1.085724	4.060107
4	.222143	-.500000	.002054	.407754	.599876	.000000	.002061	2.734043	1.114818	3.914225
5	.222143	-.500000	.003572	.418947	1.034208	.000000	.005158	2.591676	1.085774	3.670432
6	.222143	-.500000	.005900	.503363	1.718803	.000000	.016278	2.216068	1.115486	2.916289
7	.222143	-.500000	.009472	.756986	2.614410	.000000	.044290	1.435937	1.086984	1.605092
8	.222143	-.500000	.014952	1.070598	2.963060	.000000	.072019	1.045549	1.119363	1.017404
9	.222143	-.500000	.023359	1.073794	2.978823	.000000	.064749	1.023209	1.098715	.994480
10	.222143	-.500000	.036256	1.092640	2.968229	.000000	.081634	1.036840	1.132893	1.000739
11	.222143	-.500000	.056041	1.118681	2.960046	.000000	.104305	1.046161	1.170320	1.000268
12	.222143	-.500000	.086395	1.041385	2.984385	.000000	.038271	1.017433	1.059539	1.001063
13	.222143	-.500000	.132961	1.002782	2.999340	.000000	-.000218	1.001033	1.003818	.999921
14	.222143	-.500000	.204399	.999806	3.000125	.000000	-.002070	.999851	.999657	.999928
15	.222143	-.500000	.313995	1.000000	3.000000	.000000	-.002801	1.000000	1.000000	1.000000

J= 5 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.292857	-.500000	.000000	.385832	.000000	.000000	.000000	2.806087	1.082679	4.107161
2	.292857	-.500000	.000483	.389203	.135500	.000000	.000111	2.802414	1.090709	4.087537
3	.292857	-.500000	.001223	.388592	.314323	.000000	.000424	2.786293	1.082731	4.066579
4	.292857	-.500000	.002359	.398665	.590962	.000000	.001548	2.736271	1.090854	3.952902
5	.292857	-.500000	.004101	.416729	1.017955	.000000	.004724	2.588660	1.082937	3.688145
6	.292857	-.500000	.006775	.489196	1.696883	.000000	.012676	2.230318	1.091061	2.968751
7	.292857	-.500000	.010876	.742538	2.590813	.000000	.039263	1.460165	1.084229	1.644805
8	.292857	-.500000	.017168	1.045786	2.963605	.000000	.057757	1.045052	1.092901	1.026504
9	.292857	-.500000	.026820	1.073470	2.981099	.000000	.062230	1.020777	1.095773	.992236
10	.292857	-.500000	.041628	1.066107	2.977269	.000000	.056465	1.026134	1.093969	1.000193
11	.292857	-.500000	.064346	1.113468	2.962257	.000000	.101997	1.044364	1.162865	1.000416
12	.292857	-.500000	.099197	1.062832	2.976828	.000000	.056536	1.025995	1.090460	1.001289
13	.292857	-.500000	.152664	1.008789	2.997016	.000000	.005348	1.003470	1.012290	.999964
14	.292857	-.500000	.234688	.999453	3.000365	.000000	-.002460	.999698	.999152	.999917
15	.292857	-.500000	.360524	1.000000	3.000000	.000000	-.002994	1.000000	1.000000	1.000000

J= 6 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.363571	-.500000	.000000	.387198	.000000	.000000	.000000	2.805869	1.086428	4.101040
2	.363571	-.500000	.000538	.381317	.134081	.000000	.000098	2.802271	1.068552	4.120937
3	.363571	-.500000	.001363	.389897	.310829	.000000	.000457	2.786631	1.086500	4.061620
4	.363571	-.500000	.002628	.390364	.584858	.000000	.001102	2.737312	1.068549	3.987625
5	.363571	-.500000	.004570	.417526	1.007575	.000000	.004558	2.603086	1.086855	3.691605
6	.363571	-.500000	.007549	.477224	1.682007	.000000	.009960	2.238843	1.068430	3.009779

7	.363571	-.500000	.012118	.738476	2.578329	.000000	.035893	1.473613	1.088228	1.663600
8	.363571	-.500000	.019129	1.023116	2.962893	.000000	.048247	1.045345	1.069509	1.035833
9	.363571	-.500000	.029883	1.076583	2.982633	.000000	.059602	1.019681	1.097771	.990023
10	.363571	-.500000	.046383	1.049448	2.982779	.000000	.042669	1.019004	1.069392	.999520
11	.363571	-.500000	.071695	1.099464	2.966982	.000000	.090874	1.039628	1.143034	1.000935
12	.363571	-.500000	.110527	1.077323	2.972284	.000000	.068170	1.031408	1.111159	1.001134
13	.363571	-.500000	.170099	1.016492	2.994019	.000000	.012576	1.006694	1.023296	1.000129
14	.363571	-.500000	.261492	.999571	3.000470	.000000	-.002534	.999720	.999291	.999892
15	.363571	-.500000	.401700	1.000000	3.000000	.000000	-.003279	1.000000	1.000000	1.000000

J= 7 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.434286	-.500000	.000000	.387983	.000000	.000000	.000000	2.805388	1.088443	4.097018
2	.434286	-.500000	.000588	.375561	.133199	.000000	.000090	2.801839	1.052260	4.145445
3	.434286	-.500000	.001489	.390641	.308929	.000000	.000480	2.786511	1.088526	4.058351
4	.434286	-.500000	.002873	.384350	.581106	.000000	.000781	2.737534	1.052170	4.012997
5	.434286	-.500000	.004995	.418007	1.002516	.000000	.004366	2.605104	1.088951	3.692766
6	.434286	-.500000	.008250	.469082	1.674055	.000000	.008125	2.242441	1.051889	3.035439
7	.434286	-.500000	.013244	.736402	2.572604	.000000	.032879	1.480540	1.090273	1.673301
8	.434286	-.500000	.020906	1.005769	2.960903	.000000	.042606	1.046769	1.052808	1.044364
9	.434286	-.500000	.032661	1.077631	2.984822	.000000	.054993	1.018034	1.097065	.988039
10	.434286	-.500000	.050693	1.040672	2.985532	.000000	.037722	1.015077	1.056362	.999019
11	.434286	-.500000	.078357	1.084060	2.972064	.000000	.076685	1.034236	1.121174	1.001379
12	.434286	-.500000	.120798	1.085181	2.970240	.000000	.074505	1.034167	1.122258	1.000898
13	.434286	-.500000	.185907	1.024572	2.990816	.000000	.020264	1.010078	1.034898	1.000318
14	.434286	-.500000	.285793	1.000132	3.000362	.000000	-.002145	.999915	1.000047	.999862
15	.434286	-.500000	.439030	1.000000	3.000000	.000000	-.003447	1.000000	1.000000	1.000000

J= 8 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.505000	-.500000	.000000	.387340	.000000	.000000	.000000	2.804742	1.086389	4.098791
2	.505000	-.500000	.000634	.372238	.132647	.000000	.000083	2.801222	1.042742	4.159290
3	.505000	-.500000	.001606	.389966	.308010	.000000	.000476	2.786063	1.086470	4.060505
4	.505000	-.500000	.003098	.380890	.578934	.000000	.000599	2.737274	1.042602	4.027154
5	.505000	-.500000	.005386	.417164	1.000874	.000000	.004083	2.605429	1.086891	3.696209
6	.505000	-.500000	.008896	.464753	1.671519	.000000	.007037	2.242669	1.042286	3.047028
7	.505000	-.500000	.014282	.732993	2.569769	.000000	.030033	1.484412	1.088064	1.680794
8	.505000	-.500000	.022544	.994214	2.957915	.000000	.039460	1.049363	1.043291	1.051801
9	.505000	-.500000	.035219	1.075631	2.987575	.000000	.049250	1.015587	1.092396	.986397
10	.505000	-.500000	.054665	1.036982	2.986677	.000000	.037255	1.013238	1.050709	.998626
11	.505000	-.500000	.084496	1.070448	2.976447	.000000	.062649	1.029263	1.101772	1.001613
12	.505000	-.500000	.130262	1.087689	2.970016	.000000	.076691	1.034954	1.125708	1.000735
13	.505000	-.500000	.200472	1.032385	2.987914	.000000	.027531	1.013300	1.046116	1.000464
14	.505000	-.500000	.308183	1.001365	2.999974	.000000	-.001268	1.000394	1.001760	.999848
15	.505000	-.500000	.473426	1.000000	3.000000	.000000	-.003678	1.000000	1.000000	1.000000

J= 9 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.575714	-.500000	.000000	.385579	.000000	.000000	.000000	2.804129	1.081215	4.105372
2	.575714	-.500000	.000677	.370884	.132324	.000000	.000078	2.800627	1.038709	4.164472
3	.575714	-.500000	.001715	.388181	.307671	.000000	.000448	2.785524	1.081287	4.067180
4	.575714	-.500000	.003307	.379484	.577884	.000000	.000527	2.736860	1.038595	4.032506
5	.575714	-.500000	.005751	.415256	1.001228	.000000	.003731	2.604791	1.081655	3.702087
6	.575714	-.500000	.009499	.463379	1.673061	.000000	.006479	2.240759	1.038322	3.048038
7	.575714	-.500000	.015249	.728290	2.568410	.000000	.027460	1.486551	1.082640	1.687555
8	.575714	-.500000	.024071	.987498	2.954528	.000000	.037697	1.052612	1.039452	1.057923
9	.575714	-.500000	.037604	1.071564	2.990543	.000000	.043508	1.012708	1.085181	.985092
10	.575714	-.500000	.058367	1.036214	2.987070	.000000	.038304	1.012534	1.049202	.998228
11	.575714	-.500000	.090218	1.059477	2.979958	.000000	.050428	1.025081	1.086050	1.001662
12	.575714	-.500000	.139083	1.086524	2.970939	.000000	.076333	1.034447	1.123951	1.000673
13	.575714	-.500000	.214048	1.039237	2.985419	.000000	.033885	1.016070	1.055938	1.000548

14	.575714	-.500000	.329054	1.002992	2.999360	.000000	.000055	1.001045	1.004040	.999849
15	.575714	-.500000	.505487	1.000000	3.000000	.000000	-.003728	1.000000	1.000000	1.000000

J= 10 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.646429	-.500000	.000000	.383185	.000000	.000000	.000000	2.803607	1.074301	4.114846
2	.646429	-.500000	.000717	.370814	.132124	.000000	.000074	2.800116	1.038323	4.164026
3	.646429	-.500000	.001817	.385767	.307545	.000000	.000404	2.785000	1.074360	4.076574
4	.646429	-.500000	.003505	.379408	.577442	.000000	.000533	2.736468	1.038238	4.032252
5	.646429	-.500000	.006094	.412722	1.002207	.000000	.003350	2.603815	1.074652	3.709771
6	.646429	-.500000	.010065	.463819	1.676750	.000000	.006241	2.238032	1.038041	3.043176
7	.646429	-.500000	.016159	.722491	2.566738	.000000	.025226	1.488535	1.075453	1.695220
8	.646429	-.500000	.025506	.983947	2.951136	.000000	.036469	1.056214	1.039259	1.063073
9	.646429	-.500000	.039847	1.066519	2.993292	.000000	.038511	1.009738	1.076905	.984060
10	.646429	-.500000	.061847	1.036981	2.987212	.000000	.039194	1.012382	1.049821	.997783
11	.646429	-.500000	.095599	1.050874	2.982569	.000000	.040638	1.021697	1.073675	1.001617
12	.646429	-.500000	.147378	1.082835	2.972557	.000000	.074016	1.033065	1.118639	1.000697
13	.646429	-.500000	.226813	1.045184	2.983490	.000000	.039196	1.018418	1.064433	1.000573
14	.646429	-.500000	.348677	1.005158	2.998506	.000000	.001766	1.001932	1.007100	.999872
15	.646429	-.500000	.535633	1.000000	3.000000	.000000	-.003790	1.000000	1.000000	1.000000

J= 11 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.717143	-.500000	.000000	.380775	.000000	.000000	.000000	2.803242	1.067405	4.124708
2	.717143	-.500000	.000755	.371334	.131996	.000000	.000069	2.799757	1.039644	4.161162
3	.717143	-.500000	.001914	.383341	.307500	.000000	.000356	2.784596	1.067451	4.086278
4	.717143	-.500000	.003691	.379941	.577344	.000000	.000564	2.736187	1.039589	4.029577
5	.717143	-.500000	.006418	.410198	1.003421	.000000	.002987	2.602813	1.067669	3.717452
6	.717143	-.500000	.010602	.465104	1.681625	.000000	.006113	2.234914	1.039468	3.035573
7	.717143	-.500000	.017019	.717069	2.565471	.000000	.023348	1.489843	1.068319	1.701830
8	.717143	-.500000	.026865	.982139	2.948076	.000000	.035392	1.059666	1.040739	1.067332
9	.717143	-.500000	.041970	1.061649	2.995642	.000000	.034410	1.007058	1.069142	.983246
10	.717143	-.500000	.065142	1.038421	2.987313	.000000	.039512	1.012430	1.051329	.997277
11	.717143	-.500000	.100692	1.044372	2.984502	.000000	.033357	1.019082	1.064300	1.001537
12	.717143	-.500000	.155230	1.077969	2.974461	.000000	.070775	1.031279	1.111686	1.000768
13	.717143	-.500000	.238897	1.049790	2.982056	.000000	.043283	1.020197	1.070993	1.000560
14	.717143	-.500000	.367254	1.007483	2.997538	.000000	.003770	1.002892	1.010397	.999906
15	.717143	-.500000	.564170	1.000000	3.000000	.000000	-.003589	1.000000	1.000000	1.000000

J= 12 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.787857	-.500000	.000000	.378477	.000000	.000000	.000000	2.802995	1.060868	4.134345
2	.787857	-.500000	.000792	.372210	.131942	.000000	.000067	2.799513	1.042007	4.158673
3	.787857	-.500000	.002006	.381032	.307522	.000000	.000300	2.784276	1.060899	4.095694
4	.787857	-.500000	.003869	.380844	.577542	.000000	.000615	2.735993	1.041987	4.025465
5	.787857	-.500000	.006727	.407807	1.004635	.000000	.002620	2.601827	1.061043	3.724745
6	.787857	-.500000	.011112	.466868	1.687059	.000000	.006053	2.231771	1.041943	3.026718
7	.787857	-.500000	.017839	.711666	2.563325	.000000	.021711	1.491659	1.061564	1.709067
8	.787857	-.500000	.028159	.981335	2.945324	.000000	.034300	1.063036	1.043195	1.071078
9	.787857	-.500000	.043990	1.057063	2.997532	.000000	.031086	1.004649	1.061977	.982594
10	.787857	-.500000	.068279	1.039891	2.987586	.000000	.039140	1.012451	1.052839	.996733
11	.787857	-.500000	.105540	1.039245	2.985891	.000000	.028216	1.017002	1.056915	1.001463
12	.787857	-.500000	.162703	1.072314	2.976501	.000000	.066710	1.029207	1.103632	1.000661
13	.787857	-.500000	.250399	1.053583	2.981085	.000000	.046490	1.021630	1.076372	1.000521
14	.787857	-.500000	.384935	1.010134	2.996428	.000000	.005987	1.003993	1.014168	.999552
15	.787857	-.500000	.591331	1.000000	3.000000	.000000	-.003381	1.000000	1.000000	1.000000

J= 13 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.858571	-.500000	.000000	.376610	.000000	.000000	.000000	2.802953	1.055621	4.142465
2	.858571	-.500000	.000826	.372967	.132030	.000000	.000063	2.799464	1.044107	4.153431
3	.858571	-.500000	.002094	.379163	.307768	.000000	.000255	2.784135	1.055642	4.103550

4	.858571	-.500000	.004039	.381635	.578173	.000000	.000650	2.735887	1.044111	4.021968
5	.858571	-.500000	.007023	.405907	1.006171	.000000	.002331	2.600924	1.055733	3.730413
6	.858571	-.500000	.011600	.468525	1.692748	.000000	.005972	2.228519	1.044117	3.018027
7	.858571	-.500000	.018622	.707696	2.562113	.000000	.020522	1.492416	1.056176	1.713764
8	.858571	-.500000	.029395	.980686	2.943062	.000000	.033254	1.065944	1.045356	1.074292
9	.858571	-.500000	.045922	1.053574	2.998890	.000000	.028918	1.002797	1.056521	.982080
10	.858571	-.500000	.071277	1.041044	2.988001	.000000	.038304	1.012307	1.053856	.996149
11	.858571	-.500000	.110174	1.035520	2.986881	.000000	.024941	1.015486	1.051555	1.001407
12	.858571	-.500000	.169848	1.066856	2.978394	.000000	.062498	1.027203	1.095878	1.000954
13	.858571	-.500000	.261394	1.056005	2.980555	.000000	.048513	1.022523	1.079789	1.000476
14	.858571	-.500000	.401839	1.012726	2.995327	.000000	.008355	1.005070	1.017860	.999599
15	.858571	-.500000	.617298	1.000000	3.000000	.000000	-.002845	1.000000	1.000000	1.000000

J= 14 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.929286	-.500000	.000000	.374917	.000000	.000000	.000000	2.802934	1.050867	4.149913
2	.929286	-.500000	.000860	.373578	.132159	.000000	.000061	2.799440	1.045808	4.150675
3	.929286	-.500000	.002179	.377469	.308031	.000000	.000210	2.784012	1.050877	4.110729
4	.929286	-.500000	.004202	.382277	.578872	.000000	.000682	2.735806	1.045837	4.019147
5	.929286	-.500000	.007306	.404175	1.007389	.000000	.002033	2.600162	1.050919	3.735706
6	.929286	-.500000	.012068	.469060	1.697633	.000000	.005796	2.225907	1.045885	3.011038
7	.929286	-.500000	.019374	.703565	2.559709	.000000	.019241	1.494237	1.051293	1.719878
8	.929286	-.500000	.030582	.979758	2.941000	.000000	.032019	1.068733	1.047100	1.077511
9	.929286	-.500000	.047776	1.050425	2.999959	.000000	.027058	1.001177	1.051662	.981668
10	.929286	-.500000	.074154	1.042146	2.988506	.000000	.037327	1.012133	1.054791	.995557
11	.929286	-.500000	.114622	1.032399	2.987637	.000000	.022763	1.014217	1.047077	1.001364
12	.929286	-.500000	.176704	1.061343	2.980250	.000000	.058071	1.025160	1.088047	1.001035
13	.929286	-.500000	.271946	1.058040	2.980234	.000000	.050124	1.023261	1.082651	1.000427
14	.929286	-.500000	.418060	1.015437	2.994176	.000000	.010762	1.006193	1.021725	1.000046
15	.929286	-.500000	.642216	1.000000	3.000000	.000000	-.002326	1.000000	1.000000	1.000000

J= 15 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.000000	-.500000	.000000	.373685	.000000	.000000	.000000	2.803077	1.047469	4.155589
2	1.000000	-.500000	.000892	.373834	.132562	.000000	.000060	2.799560	1.046569	4.149717
3	1.000000	-.500000	.002260	.376249	.308941	.000000	.000181	2.783989	1.047473	4.116018
4	1.000000	-.500000	.004359	.382595	.580806	.000000	.000701	2.735557	1.046610	4.017447
5	1.000000	-.500000	.007579	.403085	1.010912	.000000	.001847	2.598677	1.047486	3.737608
6	1.000000	-.500000	.012519	.471234	1.705452	.000000	.005684	2.221149	1.046680	3.001118
7	1.000000	-.500000	.020098	.701415	2.559450	.000000	.018446	1.493857	1.047814	1.721548
8	1.000000	-.500000	.031724	.978487	2.939576	.000000	.030852	1.070793	1.047757	1.080149
9	1.000000	-.500000	.049560	1.048150	3.000669	.000000	.025906	.999972	1.048120	.981338
10	1.000000	-.500000	.076924	1.042428	2.989272	.000000	.036099	1.011612	1.054532	.994937
11	1.000000	-.500000	.118903	1.030459	2.988084	.000000	.021985	1.013428	1.044296	1.001338
12	1.000000	-.500000	.183304	1.056554	2.981773	.000000	.053795	1.023380	1.081257	1.001107
13	1.000000	-.500000	.282103	1.058709	2.980346	.000000	.050603	1.023482	1.083569	1.000390
14	1.000000	-.500000	.433674	1.017983	2.993103	.000000	.013256	1.007245	1.025358	1.000090
15	1.000000	-.500000	.666203	1.000000	3.000000	.000000	-.001442	1.000000	1.000000	1.000000

GENERALIZED FORCES FROM DIRECT INTEGRATION OF WALL SURFACE STRESSES

.0000 -4.6633-03 .0000 1.6968-01 -1.1273-04

INITIAL OUTPUT FOR TEST CASE NO. 2 (INITIAL START RUN) SHOWING INPUT DATA AND FLOWFIELD INITIAL DATA

NMAX	JMAX	KMAX	LMAX	LAMIN	INVISC	JIBC	JMAXBC	KPLANE	KIBC	JKIWL	JKIWU	KW	JKW	KMAXBC
100	23	5	15	1	0	0	1	1	1	0	0	0	0	3

LIBC	JL1WL	JL1WU	LW	JLW	LMAXBC	NRST	IWRIT	NGRI	NP	KVIS	LVIS	KLVIS	INFLT	ISUTH	NROUT
1	0	0	0	0	1	0	1	0	50	1	1	1	0	1	100

DT	FSMACH	RMACH	RE	PR	RTDEGK	FSP	FST
5 00C0000E-02	1 0000000E+00	1 0000000E+00	9 4000000E+05	7 2000000E-01	2 9500000E+02	1 0000000E+00	1 0000000E+00

GAMMA	RMUEXP	TW	CNBR	DTFAC	RM	SMU	OMEGA
1 4000000E+00	1 0000000E+00	0	0	1 0000000E+00	0	5 0000000E-02	0

DTMAX
5 0000000E-02

THIS IS A RESTART FROM THE FOLLOWING INITIAL CONDITIONS

KMAXR	JMAXR	LMAXR	ITMAXR	LMAXBR	LIBCR	FSMACR	GAMMAR	RER	SMUR	DTR	ALPR	CNBRR	PRR
5	23	15	0	1	1								
10000000E+01	14000000E+01	94000000E+06	50000000E+00	0		0		0				72000000E+00	

THROAT LOCATION X=0 AT JT= 14
THROAT AREA AT= 3 71195E+00
K=1

L	VOU	WOU	HTOT	PTOT
1	0	0	1 0000000E+00	1 0000000E+00
2	0	0	1 0000000E+00	1 0000000E+00
3	0	0	1 0000000E+00	1 0000000E+00
4	0	0	1 0000000E+00	1 0000000E+00
5	0	0	1 0000000E+00	1 0000000E+00
6	0	0	1 0000000E+00	1 0000000E+00
7	0	0	1 0000000E+00	1 0000000E+00
8	0	0	1 0000000E+00	1 0000000E+00
9	0	0	1 0000000E+00	9 8965270E-01
10	0	0	1 0000000E+00	9 8100459E-01
11	0	0	1 0000000E+00	9 7400101E-01
12	0	0	1 0000000E+00	9 6859817E-01
13	0	0	1 0000000E+00	9 6476258E-01
14	0	0	1 0000000E+00	9 6247059E-01
15	0	0	1 0000000E+00	9 6170815E-01

J,K,L, AND MAX COURANT NBR 14 1 15 47326E+03 SMU= 5 00000E-02
GF= 3 9504E-02-7 2512E+00 0 -4 4539E+01 1 6831E-14 CW= 9 9745E-01
NC = 0 TIME = 0 0000 DT = 5000E-01

CURRENT FLOW AT NC= 0 AS WRITTEN TO RESTART FILE

J= 1 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7 423905	0 000000	0 000000	972497	235515	0 000000	0 000000	988906	961708	1 000000
2	-7 423905	0 000000	1 238146	972497	235515	0 000000	0 000000	988906	961708	1 000000
3	-7 423905	0 000000	1 880363	972497	235515	0 000000	0 000000	988906	961708	1 000000
4	-7 423905	0 000000	2 213475	972497	235515	0 000000	0 000000	988906	961708	1 000000
5	-7 423905	0 000000	2 386257	972497	235515	0 000000	0 000000	988906	961708	1 000000
6	-7 423905	0 000000	2 475878	972497	235515	0 000000	0 000000	988906	961708	1 000000
7	-7 423905	0 000000	2 522364	972497	235515	0 000000	0 000000	988906	961708	1 000000
8	-7 423905	0 000000	2 546476	972497	235515	0 000000	0 000000	988906	961708	1 000000
9	-7 423905	0 000000	2 558982	969611	201870	0 000000	0 000000	991850	961708	1 004169
10	-7 423905	0 000000	2 565469	967182	168225	0 000000	0 000000	994340	961708	1 007701
11	-7 423905	0 000000	2 568834	965204	134580	0 000000	0 000000	996378	961708	1 010593
12	-7 423905	0 000000	2 570579	963672	100935	0 000000	0 000000	997962	961708	1 012844
13	-7 423905	0 000000	2 571484	962580	067290	0 000000	0 000000	999094	961708	1 014453
14	-7 423905	0 000000	2 571954	961926	033645	0 000000	0 000000	999774	961708	1 015418
15	-7 423905	0 000000	2 572197	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740

J= 2 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6 310319	0 000000	0 000000	972497	235515	0 000000	0 000000	988906	961708	1 000000
2	-6 310319	0 000000	1 238146	972497	235515	0 000000	0 000000	988906	961708	1 000000
3	-6 310319	0 000000	1 880363	972497	235515	0 000000	0 000000	988906	961708	1 000000
4	-6 310319	0 000000	2 213475	972497	235515	0 000000	0 000000	988906	961708	1 000000
5	-6 310319	0 000000	2 386257	972497	235515	0 000000	0 000000	988906	961708	1 000000
6	-6 310319	0 000000	2 475878	972497	235515	0 000000	0 000000	988906	961708	1 000000
7	-6 310319	0 000000	2 522364	972497	235515	0 000000	0 000000	988906	961708	1 000000
8	-6 310319	0 000000	2 546476	972497	235515	0 000000	0 000000	988906	961708	1 000000
9	-6 310319	0 000000	2 558982	969611	201870	0 000000	0 000000	991850	961708	1 004169
10	-6 310319	0 000000	2 565469	967182	168225	0 000000	0 000000	994340	961708	1 007701
11	-6 310319	0 000000	2 568834	965204	134580	0 000000	0 000000	996378	961708	1 010593
12	-6 310319	0 000000	2 570579	963672	100935	0 000000	0 000000	997962	961708	1 012844
13	-6 310319	0 000000	2 571484	962580	067290	0 000000	0 000000	999094	961708	1 014453
14	-6 310319	0 000000	2 571954	961926	033645	0 000000	0 000000	999774	961708	1 015418
15	-6 310319	0 000000	2 572197	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740

J= 3 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT

1	-5.196733	0.000000	0.000000	972497	235515	0.000000	0.000000	988906	961708	1.000000
2	-5.196733	0.000000	1.238146	972497	235515	0.000000	0.000000	988906	961708	1.000000
3	-5.196733	0.000000	1.880363	972497	235515	0.000000	0.000000	988906	961708	1.000000
4	-5.196733	0.000000	2.213475	972497	235515	0.000000	0.000000	988906	961708	1.000000
5	-5.196733	0.000000	2.386257	972497	235515	0.000000	0.000000	988906	961708	1.000000
6	-5.196733	0.000000	2.475878	972497	235515	0.000000	0.000000	988906	961708	1.000000
7	-5.196733	0.000000	2.522364	972497	235515	0.000000	0.000000	988906	961708	1.000000
8	-5.196733	0.000000	2.546476	972497	235515	0.000000	0.000000	988906	961708	1.000000
9	-5.196733	0.000000	2.558982	969611	201870	0.000000	0.000000	991850	961708	1.004169
10	-5.196733	0.000000	2.565469	967182	168225	0.000000	0.000000	994340	961708	1.007701
11	-5.196733	0.000000	2.568834	965204	134580	0.000000	0.000000	996378	961708	1.010593
12	-5.196733	0.000000	2.570579	963672	100935	0.000000	0.000000	997962	961708	1.012844
13	-5.196733	0.000000	2.571484	962580	067290	0.000000	0.000000	999094	961708	1.014453
14	-5.196733	0.000000	2.571954	961926	033645	0.000000	0.000000	999774	961708	1.015418
15	-5.196733	0.000000	2.572197	961708	0.000000	0.000000	0.000000	1.000000	961708	1.015740

J= 4 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4.222346	0.000000	0.000000	972497	235515	0.000000	0.000000	988906	961708	1.000000
2	-4.222346	0.000000	1.238146	972497	235515	0.000000	-.022119	988906	961708	1.000000
3	-4.222346	0.000000	1.880363	972497	235515	0.000000	-.033592	988906	961708	1.000000
4	-4.222346	0.000000	2.213475	972497	235515	0.000000	-.039543	988906	961708	1.000000
5	-4.222346	0.000000	2.386257	972497	235515	0.000000	-.042630	988906	961708	1.000000
6	-4.222346	0.000000	2.475878	972497	235515	0.000000	-.044231	988906	961708	1.000000
7	-4.222346	0.000000	2.522364	972497	235515	0.000000	-.045061	988906	961708	1.000000
8	-4.222346	0.000000	2.546476	972497	235515	0.000000	-.045492	988906	961708	1.000000
9	-4.222346	0.000000	2.558982	969611	201870	0.000000	-.039185	991850	961708	1.004169
10	-4.222346	0.000000	2.565469	967182	168225	0.000000	-.032737	994340	961708	1.007701
11	-4.222346	0.000000	2.568834	965204	134580	0.000000	-.026224	996378	961708	1.010593
12	-4.222346	0.000000	2.570579	963672	100935	0.000000	-.019681	997962	961708	1.012844
13	-4.222346	0.000000	2.571484	962580	067290	0.000000	-.013125	999094	961708	1.014453
14	-4.222346	0.000000	2.571954	961926	033645	0.000000	-.006564	999774	961708	1.015418
15	-4.222346	0.000000	2.572197	961708	0.000000	0.000000	0.000000	1.000000	961708	1.015740

J= 5 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3.340757	0.000000	0.000000	962328	276066	0.000000	0.000000	984758	947660	1.000000
2	-3.340757	0.000000	1.063838	962328	276066	0.000000	-.054584	984758	947660	1.000000
3	-3.340757	0.000000	1.615641	962328	276066	0.000000	-.082896	984758	947660	1.000000
4	-3.340757	0.000000	1.901857	962328	276066	0.000000	-.097582	984758	947660	1.000000
5	-3.340757	0.000000	2.050315	962328	276066	0.000000	-.105199	984758	947660	1.000000
6	-3.340757	0.000000	2.127319	962328	276066	0.000000	-.109150	984758	947660	1.000000
7	-3.340757	0.000000	2.167260	962328	276066	0.000000	-.111199	984758	947660	1.000000
8	-3.340757	0.000000	2.187977	962328	276066	0.000000	-.112262	984758	947660	1.000000
9	-3.340757	0.000000	2.198723	958393	236628	0.000000	-.096697	988801	947660	1.005754
10	-3.340757	0.000000	2.204297	955088	197190	0.000000	-.080785	992223	947660	1.010630
11	-3.340757	0.000000	2.207188	952400	157752	0.000000	-.064713	995023	947660	1.014624
12	-3.340757	0.000000	2.208688	950321	118314	0.000000	-.048568	997200	947660	1.017734
13	-3.340757	0.000000	2.209465	948841	078876	0.000000	-.032390	998756	947660	1.019957
14	-3.340757	0.000000	2.209869	947955	039438	0.000000	-.016198	999689	947660	1.021292
15	-3.340757	0.000000	2.210078	947660	0.000000	0.000000	0.000000	1.000000	947660	1.021737

J= 6 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2.412769	0.000000	0.000000	943990	337579	0.000000	0.000000	977208	922475	1.000000
2	-2.412769	0.000000	.880355	943990	337579	0.000000	-.066747	977208	922475	1.000000
3	-2.412769	0.000000	1.336987	943990	337579	0.000000	-.101368	977208	922475	1.000000
4	-2.412769	0.000000	1.573839	943990	337579	0.000000	-.119325	977208	922475	1.000000
5	-2.412769	0.000000	1.696691	943990	337579	0.000000	-.128640	977208	922475	1.000000
6	-2.412769	0.000000	1.760414	943990	337579	0.000000	-.133471	977208	922475	1.000000
7	-2.412769	0.000000	1.793467	943990	337579	0.000000	-.135977	977208	922475	1.000000
8	-2.412769	0.000000	1.810611	943990	337579	0.000000	-.137277	977208	922475	1.000000
9	-2.412769	0.000000	1.819503	938185	289354	0.000000	-.118244	983255	922475	1.008674
10	-2.412769	0.000000	1.824116	933328	241128	0.000000	-.098786	988371	922475	1.016030
11	-2.412769	0.000000	1.826508	929392	192903	0.000000	-.079133	992558	922475	1.022060
12	-2.412769	0.000000	1.827749	926353	144677	0.000000	-.059390	995814	922475	1.026757
13	-2.412769	0.000000	1.828393	924194	096451	0.000000	-.039607	998139	922475	1.030115
14	-2.412769	0.000000	1.828727	922904	048226	0.000000	-.019807	999535	922475	1.032132

15	-2 412769	0 000000	1 828900	922475	0 000000	0 000000	0 000000	1 000000	922475	1 032805

J= 7 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1 855976	0 000000	0 000000	924597	392888	0 000000	0 000000	969128	896053	1 000000
2	-1 855976	0 000000	770265	924597	392888	0 000000	- 077682	969128	896053	1 000000
3	-1 855976	0 000000	1 169795	924597	392888	0 000000	- 117976	969128	896053	1 000000
4	-1 855976	0 000000	1 377027	924597	392888	0 000000	- 138875	969128	896053	1 000000
5	-1 855976	0 000000	1 484517	924597	392888	0 000000	- 149716	969128	896053	1 000000
6	-1 855976	0 000000	1 540271	924597	392888	0 000000	- 155339	969128	896053	1 000000
7	-1 855976	0 000000	1 569191	924597	392888	0 000000	- 158255	969128	896053	1 000000
8	-1 855976	0 000000	1 584191	924597	392888	0 000000	- 159768	969128	896053	1 000000
9	-1 855976	0 000000	1 591971	916849	336761	0 000000	- 137617	977318	896053	1 011852
10	-1 855976	0 000000	1 596007	910393	280634	0 000000	- 114971	984249	896053	1 021912
11	-1 855976	0 000000	1 598100	905178	224508	0 000000	- 092098	989919	896053	1 030164
12	-1 855976	0 000000	1 599186	901163	168381	0 000000	- 069120	994330	896053	1 036595
13	-1 855976	0 000000	1 599749	898317	112254	0 000000	- 046096	997480	896053	1 041196
14	-1 855976	0 000000	1 600041	896618	056127	0 000000	- 023052	999370	896053	1 043959
15	-1 855976	0 000000	1 600193	896053	0 000000	0 000000	0 000000	1 000000	896053	1 044880

J= 8 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1 391982	0 000000	0 000000	898460	457848	0 000000	0 000000	958075	860792	1 000000
2	-1 391982	0 000000	678523	898460	457848	0 000000	- 090526	958075	860792	1 000000
3	-1 391982	0 000000	1 030468	898460	457848	0 000000	- 137482	958075	860792	1 000000
4	-1 391982	0 000000	1 213018	898460	457848	0 000000	- 161837	958075	860792	1 000000
5	-1 391982	0 000000	1 307706	898460	457848	0 000000	- 174470	958075	860792	1 000000
6	-1 391982	0 000000	1 356819	898460	457848	0 000000	- 181022	958075	860792	1 000000
7	-1 391982	0 000000	1 382294	898460	457848	0 000000	- 184421	958075	860792	1 000000
8	-1 391982	0 000000	1 395508	898460	457848	0 000000	- 186184	958075	860792	1 000000
9	-1 391982	0 000000	1 402361	888149	392442	0 000000	- 160370	969198	860792	1 016291
10	-1 391982	0 000000	1 405916	879607	327035	0 000000	- 133981	978610	860792	1 030135
11	-1 391982	0 000000	1 407760	872740	261628	0 000000	- 107325	986310	860792	1 041501
12	-1 391982	0 000000	1 408717	867472	196221	0 000000	- 080548	992299	860792	1 050366
13	-1 391982	0 000000	1 409213	863748	130814	0 000000	- 053718	996578	860792	1 056711
14	-1 391982	0 000000	1 409470	861529	065407	0 000000	- 026864	999144	860792	1 060523
15	-1 391982	0 000000	1 409604	860792	0 000000	0 000000	0 000000	1 000000	860792	1 061795

J= 9 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1 113586	0 000000	0 000000	874172	511713	0 000000	0 000000	947630	828392	1 000000
2	-1 113586	0 000000	623478	874172	511713	0 000000	- 101177	947630	828392	1 000000
3	-1 113586	0 000000	946871	874172	511713	0 000000	- 153656	947630	828392	1 000000
4	-1 113586	0 000000	1 114613	874172	511713	0 000000	- 180877	947630	828392	1 000000
5	-1 113586	0 000000	1 201618	874172	511713	0 000000	- 194996	947630	828392	1 000000
6	-1 113586	0 000000	1 246748	874172	511713	0 000000	- 202319	947630	828392	1 000000
7	-1 113586	0 000000	1 270156	874172	511713	0 000000	- 206118	947630	828392	1 000000
8	-1 113586	0 000000	1 282298	874172	511713	0 000000	- 208088	947630	828392	1 000000
9	-1 113586	0 000000	1 288595	861540	438611	0 000000	- 179237	961524	828392	1 020587
10	-1 113586	0 000000	1 291862	851133	365509	0 000000	- 149743	973281	828392	1 038100
11	-1 113586	0 000000	1 293556	842804	292407	0 000000	- 119952	982900	828392	1 052491
12	-1 113586	0 000000	1 294435	836437	219306	0 000000	- 090025	990381	828392	1 063724
13	-1 113586	0 000000	1 294891	831948	146204	0 000000	- 060038	995725	828392	1 071768
14	-1 113586	0 000000	1 295127	829278	073102	0 000000	- 030024	998931	828392	1 076603
15	-1 113586	0 000000	1 295250	828392	0 000000	0 000000	0 000000	1 000000	828392	1 078216

J= 10 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	- 881589	0 000000	0 000000	844754	571215	0 000000	0 000000	934743	789627	1 000000
2	- 881589	0 000000	577608	844754	571215	0 000000	- 110713	934743	789627	1 000000
3	- 881589	0 000000	877208	844754	571215	0 000000	- 168139	934743	789627	1 000000
4	- 881589	0 000000	1 032608	844754	571215	0 000000	- 197926	934743	789627	1 000000
5	- 881589	0 000000	1 113213	844754	571215	0 000000	- 213376	934743	789627	1 000000
6	- 881589	0 000000	1 155022	844754	571215	0 000000	- 221389	934743	789627	1 000000
7	- 881589	0 000000	1 176708	844754	571215	0 000000	- 225546	934743	789627	1 000000
8	- 881589	0 000000	1 187956	844754	571215	0 000000	- 227702	934743	789627	1 000000
9	- 881589	0 000000	1 193790	829392	489613	0 000000	- 196132	952056	789627	1 026026
10	- 881589	0 000000	1 196817	816823	408011	0 000000	- 163857	966705	789627	1 048197
11	- 881589	0 000000	1 198386	806819	326409	0 000000	- 131258	978691	789627	1 066437

12	-.881589	0.000000	1.199201	799207	244807	0.000000	-.098510	988014	789627	1.080686
13	-.881589	0.000000	1.199623	793856	163204	0.000000	-.065697	994673	789627	1.090896
14	-.881589	0.000000	1.199842	790680	081602	0.000000	-.032854	998668	789627	1.097036
15	-.881589	0.000000	1.199955	789627	0.000000	0.000000	0.000000	1.000000	789627	1.099085

J= 11 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	0.000000	0.000000	801045	651583	0.000000	0.000000	915088	733027	1.000000
2	-.649592	0.000000	533547	801045	651583	0.000000	-.105368	915088	733027	1.000000
3	-.649592	0.000000	810293	801045	651583	0.000000	-.160021	915088	733027	1.000000
4	-.649592	0.000000	953839	801045	651583	0.000000	-.188370	915088	733027	1.000000
5	-.649592	0.000000	1.028295	801045	651583	0.000000	-.203074	915088	733027	1.000000
6	-.649592	0.000000	1.066915	801045	651583	0.000000	-.210701	915088	733027	1.000000
7	-.649592	0.000000	1.086947	801045	651583	0.000000	-.214657	915088	733027	1.000000
8	-.649592	0.000000	1.097337	801045	651583	0.000000	-.216708	915088	733027	1.000000
9	-.649592	0.000000	1.102726	781799	558499	0.000000	-.186662	937616	733027	1.034634
10	-.649592	0.000000	1.105522	766222	465416	0.000000	-.155946	956678	733027	1.064201
11	-.649592	0.000000	1.106972	753931	372333	0.000000	-.124921	972274	733027	1.088569
12	-.649592	0.000000	1.107724	744641	279250	0.000000	-.093754	984404	733027	1.107630
13	-.649592	0.000000	1.108114	738144	186166	0.000000	-.062525	993068	733027	1.121303
14	-.649592	0.000000	1.108316	734300	093083	0.000000	-.031268	998267	733027	1.129529
15	-.649592	0.000000	1.108421	733027	0.000000	0.000000	0.000000	1.000000	733027	1.132275

J= 12 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	0.000000	0.000000	747803	740757	0.000000	0.000000	890256	665736	1.000000
2	-.417595	0.000000	502575	747803	740757	0.000000	-.076688	890256	665736	1.000000
3	-.417595	0.000000	763256	747803	740757	0.000000	-.116465	890256	665736	1.000000
4	-.417595	0.000000	898469	747803	740757	0.000000	-.137097	890256	665736	1.000000
5	-.417595	0.000000	968603	747803	740757	0.000000	-.147799	890256	665736	1.000000
6	-.417595	0.000000	1.004981	747803	740757	0.000000	-.153349	890256	665736	1.000000
7	-.417595	0.000000	1.023850	747803	740757	0.000000	-.156229	890256	665736	1.000000
8	-.417595	0.000000	1.033637	747803	740757	0.000000	-.157722	890256	665736	1.000000
9	-.417595	0.000000	1.038714	724121	634934	0.000000	-.135854	919372	665736	1.046085
10	-.417595	0.000000	1.041347	705223	529112	0.000000	-.113499	944008	665736	1.085538
11	-.417595	0.000000	1.042713	690479	423290	0.000000	-.090918	964165	665736	1.118127
12	-.417595	0.000000	1.043421	679431	317467	0.000000	-.068235	979843	665736	1.143663
13	-.417595	0.000000	1.043788	671754	211645	0.000000	-.045506	991041	665736	1.162004
14	-.417595	0.000000	1.043979	667230	105822	0.000000	-.022757	997760	665736	1.173048
15	-.417595	0.000000	1.044078	665736	0.000000	0.000000	0.000000	1.000000	665736	1.176736

J= 13 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	0.000000	0.000000	687354	834445	0.000000	0.000000	860740	591634	1.000000
2	-.185598	0.000000	485511	687354	834445	0.000000	-.042397	860740	591634	1.000000
3	-.185598	0.000000	737342	687354	834445	0.000000	-.064387	860740	591634	1.000000
4	-.185598	0.000000	867964	687354	834445	0.000000	-.075794	860740	591634	1.000000
5	-.185598	0.000000	935717	687354	834445	0.000000	-.081710	860740	591634	1.000000
6	-.185598	0.000000	970860	687354	834445	0.000000	-.084779	860740	591634	1.000000
7	-.185598	0.000000	989088	687354	834445	0.000000	-.086371	860740	591634	1.000000
8	-.185598	0.000000	998543	687354	834445	0.000000	-.087197	860740	591634	1.000000
9	-.185598	0.000000	1.003447	659064	715238	0.000000	-.075107	897687	591634	1.060605
10	-.185598	0.000000	1.005991	636885	596032	0.000000	-.062748	928949	591634	1.112673
11	-.185598	0.000000	1.007310	619818	476825	0.000000	-.050264	954527	591634	1.155800
12	-.185598	0.000000	1.007995	607164	357619	0.000000	-.037724	974422	591634	1.189665
13	-.185598	0.000000	1.008350	598437	238413	0.000000	-.025158	988632	591634	1.214024
14	-.185598	0.000000	1.008534	593320	119206	0.000000	-.012581	997158	591634	1.228707
15	-.185598	0.000000	1.008629	591634	0.000000	0.000000	0.000000	1.000000	591634	1.233613

J= 14 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	0.000000	0.000000	633938	912871	0.000000	0.000000	833333	528282	1.000000
2	0.000000	0.000000	481357	633938	912871	0.000000	-.008290	833333	528282	1.000000
3	0.000000	0.000000	731034	633938	912871	0.000000	-.012589	833333	528282	1.000000
4	0.000000	0.000000	860538	633938	912871	0.000000	-.014820	833333	528282	1.000000
5	0.000000	0.000000	927712	633938	912871	0.000000	-.015977	833333	528282	1.000000
6	0.000000	0.000000	962554	633938	912871	0.000000	-.016577	833333	528282	1.000000
7	0.000000	0.000000	980626	633938	912871	0.000000	-.016888	833333	528282	1.000000
8	0.000000	0.000000	990000	633938	912871	0.000000	-.017049	833333	528282	1.000000

9	0.000000	0.000000	994862	601996	782461	0.000000	-.014685	877551	528282	1.075066
10	0.000000	0.000000	997384	577379	652051	0.000000	-.012269	914966	528282	1.139779
11	0.000000	0.000000	998692	558686	521641	0.000000	-.009828	945578	528282	1.193521
12	0.000000	0.000000	999371	544964	391230	0.000000	-.007376	969388	528282	1.235806
13	0.000000	0.000000	999723	535568	260820	0.000000	-.004919	986395	528282	1.266265
14	0.000000	0.000000	999905	530085	130410	0.000000	-.002460	996599	528282	1.284642
15	0.000000	0.000000	1.000000	528282	0.000000	0.000000	0.000000	1.000000	528282	1.290785

J= 15 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	139198	0.000000	0.000000	605042	954132	0.000000	0.000000	817926	494880	1.000000
2	139198	0.000000	482562	605042	954132	0.000000	009103	817926	494880	1.000000
3	139198	0.000000	732863	605042	954132	0.000000	013825	817926	494880	1.000000
4	139198	0.000000	862692	605042	954132	0.000000	016274	817926	494880	1.000000
5	139198	0.000000	930033	605042	954132	0.000000	017545	817926	494880	1.000000
6	139198	0.000000	964962	605042	954132	0.000000	018204	817926	494880	1.000000
7	139198	0.000000	983080	605042	954132	0.000000	018545	817926	494880	1.000000
8	139198	0.000000	992477	605042	954132	0.000000	018723	817926	494880	1.000000
9	139198	0.000000	997351	571302	817827	0.000000	016127	866232	494880	1.083647
10	139198	0.000000	999880	545559	681523	0.000000	013473	907105	494880	1.155902
11	139198	0.000000	1.001191	526162	545218	0.000000	010793	940547	494880	1.215998
12	139198	0.000000	1.001871	512002	408914	0.000000	008100	966558	494880	1.263337
13	139198	0.000000	1.002224	502346	272609	0.000000	005402	985137	494880	1.297464
14	139198	0.000000	1.002407	496726	136305	0.000000	002701	996284	494880	1.318064
15	139198	0.000000	1.002502	494880	0.000000	0.000000	0.000000	1.000000	494880	1.324952

J= 16 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	324796	0.000000	0.000000	587148	979379	0.000000	0.000000	808163	474512	1.000000
2	324796	0.000000	484456	587148	979379	0.000000	009997	808163	474512	1.000000
3	324796	0.000000	735740	587148	979379	0.000000	015182	808163	474512	1.000000
4	324796	0.000000	866078	587148	979379	0.000000	017872	808163	474512	1.000000
5	324796	0.000000	933684	587148	979379	0.000000	019267	808163	474512	1.000000
6	324796	0.000000	968750	587148	979379	0.000000	019990	808163	474512	1.000000
7	324796	0.000000	986939	587148	979379	0.000000	020366	808163	474512	1.000000
8	324796	0.000000	996373	587148	979379	0.000000	020560	808163	474512	1.000000
9	324796	0.000000	1.001267	552362	839468	0.000000	017710	859059	474512	1.089264
10	324796	0.000000	1.003805	525994	699557	0.000000	014796	902124	474512	1.166471
11	324796	0.000000	1.005122	506222	559645	0.000000	011852	937359	474512	1.230750
12	324796	0.000000	1.005805	491842	419734	0.000000	008895	964765	474512	1.281419
13	324796	0.000000	1.006159	482061	279823	0.000000	005932	984340	474512	1.317966
14	324796	0.000000	1.006342	476377	139911	0.000000	002967	996085	474512	1.340035
15	324796	0.000000	1.006438	474512	0.000000	0.000000	0.000000	1.000000	474512	1.347415

J= 17 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	603192	0.000000	0.000000	568850	1.005005	0.000000	0.000000	797993	453938	1.000000
2	603192	0.000000	487298	568850	1.005005	0.000000	010258	797993	453938	1.000000
3	603192	0.000000	740055	568850	1.005005	0.000000	015579	797993	453938	1.000000
4	603192	0.000000	871159	568850	1.005005	0.000000	018339	797993	453938	1.000000
5	603192	0.000000	939161	568850	1.005005	0.000000	019771	797993	453938	1.000000
6	603192	0.000000	974433	568850	1.005005	0.000000	020513	797993	453938	1.000000
7	603192	0.000000	992728	568850	1.005005	0.000000	020899	797993	453938	1.000000
8	603192	0.000000	1.002218	568850	1.005005	0.000000	021098	797993	453938	1.000000
9	603192	0.000000	1.007140	533050	861433	0.000000	018173	851587	453938	1.095271
10	603192	0.000000	1.009693	506099	717861	0.000000	015183	896935	453938	1.177787
11	603192	0.000000	1.011017	485995	574289	0.000000	012162	934038	453938	1.246557
12	603192	0.000000	1.011704	471430	430717	0.000000	009128	962897	453938	1.300807
13	603192	0.000000	1.012061	461549	287144	0.000000	006087	983510	453938	1.339959
14	603192	0.000000	1.012245	455817	143572	0.000000	003044	995877	453938	1.363608
15	603192	0.000000	1.012341	453938	0.000000	0.000000	0.000000	1.000000	453938	1.371518

J= 18 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	0.000000	0.000000	540822	1.043966	0.000000	0.000000	782027	422937	1.000000
2	1.206385	0.000000	493455	540822	1.043966	0.000000	010656	782027	422937	1.000000
3	1.206385	0.000000	749406	540822	1.043966	0.000000	016183	782027	422937	1.000000
4	1.206385	0.000000	882166	540822	1.043966	0.000000	019050	782027	422937	1.000000
5	1.206385	0.000000	951027	540822	1.043966	0.000000	020537	782027	422937	1.000000

6	1.206385	0.000000	.986745	.540822	1.043966	0.000000	.021309	.782027	.422937	1.000000
7	1.206385	0.000000	1.005271	.540822	1.043966	0.000000	.021709	.782027	.422937	1.000000
8	1.206385	0.000000	1.014881	.540822	1.043966	0.000000	.021916	.782027	.422937	1.000000
9	1.206385	0.000000	1.019865	.503583	.894828	0.000000	.018878	.839856	.422937	1.105037
10	1.206385	0.000000	1.022451	.475858	.745690	0.000000	.015771	.888789	.422937	1.196212
11	1.206385	0.000000	1.023792	.455346	.596552	0.000000	.012634	.928825	.422937	1.272323
12	1.206385	0.000000	1.024487	.440576	.447414	0.000000	.009482	.959964	.422937	1.332437
13	1.206385	0.000000	1.024848	.430599	.298276	0.000000	.006323	.982206	.422937	1.375858
14	1.206385	0.000000	1.025035	.424827	.149138	0.000000	.003162	.995552	.422937	1.402100
15	1.206385	0.000000	1.025132	.422937	0.000000	0.000000	0.000000	1.000000	.422937	1.410879

J= 19 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	0.000000	0.000000	.519521	1.073411	0.000000	0.000000	.769558	.399801	1.000000
2	1.809577	0.000000	.499612	.519521	1.073411	0.000000	.010957	.769558	.399801	1.000000
3	1.809577	0.000000	.758757	.519521	1.073411	0.000000	.016640	.769558	.399801	1.000000
4	1.809577	0.000000	.893173	.519521	1.073411	0.000000	.019588	.769558	.399801	1.000000
5	1.809577	0.000000	.962893	.519521	1.073411	0.000000	.021117	.769558	.399801	1.000000
6	1.809577	0.000000	.999057	.519521	1.073411	0.000000	.021910	.769558	.399801	1.000000
7	1.809577	0.000000	1.017814	.519521	1.073411	0.000000	.022321	.769558	.399801	1.000000
8	1.809577	0.000000	1.027544	.519521	1.073411	0.000000	.022534	.769558	.399801	1.000000
9	1.809577	0.000000	1.032590	.481285	.920067	0.000000	.019410	.830695	.399801	1.112963
10	1.809577	0.000000	1.035208	.453070	.766722	0.000000	.016216	.882427	.399801	1.211192
11	1.809577	0.000000	1.036566	.432333	.613378	0.000000	.012990	.924754	.399801	1.293298
12	1.809577	0.000000	1.037270	.417471	.460033	0.000000	.009749	.957674	.399801	1.358210
13	1.809577	0.000000	1.037635	.407466	.306689	0.000000	.006502	.981188	.399801	1.405127
14	1.809577	0.000000	1.037825	.401690	.153344	0.000000	.003251	.995297	.399801	1.433495
15	1.809577	0.000000	1.037923	.399801	0.000000	0.000000	0.000000	1.000000	.399801	1.442987

J= 20 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	0.000000	0.000000	.503032	1.096145	0.000000	0.000000	.759693	.382150	1.000000
2	2.366370	0.000000	.505295	.503032	1.096145	0.000000	.011189	.759693	.382150	1.000000
3	2.366370	0.000000	.767388	.503032	1.096145	0.000000	.016992	.759693	.382150	1.000000
4	2.366370	0.000000	.903333	.503032	1.096145	0.000000	.020003	.759693	.382150	1.000000
5	2.366370	0.000000	.973847	.503032	1.096145	0.000000	.021564	.759693	.382150	1.000000
6	2.366370	0.000000	1.010422	.503032	1.096145	0.000000	.022374	.759693	.382150	1.000000
7	2.366370	0.000000	1.029393	.503032	1.096145	0.000000	.022794	.759693	.382150	1.000000
8	2.366370	0.000000	1.039233	.503032	1.096145	0.000000	.023012	.759693	.382150	1.000000
9	2.366370	0.000000	1.044337	.464085	.939553	0.000000	.019821	.823448	.382150	1.119431
10	2.366370	0.000000	1.046984	.435551	.782961	0.000000	.016560	.877394	.382150	1.223431
11	2.366370	0.000000	1.048357	.414690	.626369	0.000000	.013265	.921532	.382150	1.310453
12	2.366370	0.000000	1.049070	.399796	.469776	0.000000	.009956	.955862	.382150	1.379303
13	2.366370	0.000000	1.049439	.389796	.313184	0.000000	.006639	.980383	.382150	1.429094
14	2.366370	0.000000	1.049631	.384033	.156592	0.000000	.003320	.995096	.382150	1.459208
15	2.366370	0.000000	1.049730	.382150	0.000000	0.000000	0.000000	1.000000	.382150	1.469287

J= 21 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	0.000000	0.000000	.484093	1.122229	0.000000	0.000000	.748120	.362160	1.000000
2	3.108760	0.000000	.512873	.484093	1.122229	0.000000	.011455	.748120	.362160	1.000000
3	3.108760	0.000000	.778896	.484093	1.122229	0.000000	.017397	.748120	.362160	1.000000
4	3.108760	0.000000	.916880	.484093	1.122229	0.000000	.020479	.748120	.362160	1.000000
5	3.108760	0.000000	.988451	.484093	1.122229	0.000000	.022077	.748120	.362160	1.000000
6	3.108760	0.000000	1.025575	.484093	1.122229	0.000000	.022906	.748120	.362160	1.000000
7	3.108760	0.000000	1.044830	.484093	1.122229	0.000000	.023336	.748120	.362160	1.000000
8	3.108760	0.000000	1.054818	.484093	1.122229	0.000000	.023559	.748120	.362160	1.000000
9	3.108760	0.000000	1.059999	.444397	.961911	0.000000	.020293	.814946	.362160	1.127249
10	3.108760	0.000000	1.062686	.415564	.801592	0.000000	.016954	.871490	.362160	1.238247
11	3.108760	0.000000	1.064080	.394615	.641274	0.000000	.013581	.917754	.362160	1.331240
12	3.108760	0.000000	1.064802	.379727	.480955	0.000000	.010192	.953736	.362160	1.404881
13	3.108760	0.000000	1.065177	.369763	.320637	0.000000	.006797	.979438	.362160	1.458169
14	3.108760	0.000000	1.065372	.364031	.160318	0.000000	.003399	.994860	.362160	1.490412
15	3.108760	0.000000	1.065473	.362160	0.000000	0.000000	0.000000	1.000000	.362160	1.501205

J= 22 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	0.000000	0.000000	.469525	1.142295	0.000000	0.000000	.739033	.346994	1.000000
2	3.758352	0.000000	.519504	.469525	1.142295	0.000000	.011660	.739033	.346994	1.000000

3	3.758352	0.000000	.788966	469525	1.142295	0.000000	.017708	.739033	.346994	1.000000
4	3.758352	0.000000	.928734	469525	1.142295	0.000000	.020845	.739033	.346994	1.000000
5	3.758352	0.000000	1.001231	469525	1.142295	0.000000	.022472	.739033	.346994	1.000000
6	3.758352	0.000000	1.038834	469525	1.142295	0.000000	.023316	.739033	.346994	1.000000
7	3.758352	0.000000	1.058338	469525	1.142295	0.000000	.023754	.739033	.346994	1.000000
8	3.758352	0.000000	1.068455	469525	1.142295	0.000000	.023981	.739033	.346994	1.000000
9	3.758352	0.000000	1.073703	.429306	.979110	0.000000	.020656	.808269	.346994	1.133572
10	3.758352	0.000000	1.076425	.400292	.815925	0.000000	.017257	.866853	.346994	1.250244
11	3.758352	0.000000	1.077836	.379317	.652740	0.000000	.013824	.914786	.346994	1.348089
12	3.758352	0.000000	1.078569	.364464	.489555	0.000000	.010375	.952067	.346994	1.425626
13	3.758352	0.000000	1.078948	.354547	.326370	0.000000	.006919	.978697	.346994	1.481762
14	3.758352	0.000000	1.079145	.348852	.163185	0.000000	.003460	.994674	.346994	1.515738
15	3.758352	0.000000	1.079248	.346994	0.000000	0.000000	0.000000	1.000000	.346994	1.527113

J= 23 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	4.222346	0.000000	0.000000	.459995	1.155432	0.000000	0.000000	.732995	.337174	1.000000
2	4.222346	0.000000	.524240	.459995	1.155432	0.000000	.011794	.732995	.337174	1.000000
3	4.222346	0.000000	.796159	.459995	1.155432	0.000000	.017911	.732995	.337174	1.000000
4	4.222346	0.000000	.937201	.459995	1.155432	0.000000	.021084	.732995	.337174	1.000000
5	4.222346	0.000000	1.010358	.459995	1.155432	0.000000	.022730	.732995	.337174	1.000000
6	4.222346	0.000000	1.048305	.459995	1.155432	0.000000	.023584	.732995	.337174	1.000000
7	4.222346	0.000000	1.067987	.459995	1.155432	0.000000	.024027	.732995	.337174	1.000000
8	4.222346	0.000000	1.078196	.459995	1.155432	0.000000	.024256	.732995	.337174	1.000000
9	4.222346	0.000000	1.083491	.419458	.990371	0.000000	.020893	.803833	.337174	1.137865
10	4.222346	0.000000	1.086238	.390350	.825309	0.000000	.017455	.863773	.337174	1.258398
11	4.222346	0.000000	1.087663	.369378	.660247	0.000000	.013982	.912815	.337174	1.359547
12	4.222346	0.000000	1.088402	.354562	.495185	0.000000	.010494	.950958	.337174	1.439741
13	4.222346	0.000000	1.088785	.344687	.330124	0.000000	.006998	.978204	.337174	1.497819
14	4.222346	0.000000	1.088984	.339021	.165062	0.000000	.003500	.994551	.337174	1.532979
15	4.222346	0.000000	1.089087	.337174	0.000000	0.000000	0.000000	1.000000	.337174	1.544751

FINAL FLOWFIELD PRINTED OUTPUT FOR TEST CASE NO. 2 (RESULTS OF RESTART RUN)

NC=500 TIME= 112 2923 DT= 3000E-00 MAXIMUM DELTAQ/Q=-9 064E-05AT J,K,L,N= 3, 1,14, 2
GF=-3 1357E-06-7 2612E-00 0 -4 4406E-01-3 2614E-04 CW= 9 9721E-01

CURRENT FLOW AT NC= 500 AS WRITTEN TO RESTART FILE

J= 1 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7 423905	0 000000	0 000000	972928	233647	0 000000	0 000000	989082	962305	1 000000
2	-7 423905	0 000000	1 238146	973457	231334	0 000000	0 000000	989297	963038	1 000000
3	-7 423905	0 000000	1 880363	973972	229060	0 000000	0 000000	989506	963751	1 000000
4	-7 423905	0 000000	2 213475	973734	230112	0 000000	0 000000	989410	963422	1 000000
5	-7 423905	0 000000	2 386257	973218	232379	0 000000	0 000000	989200	962707	1 000000
6	-7 423905	0 000000	2 475878	972770	234333	0 000000	0 000000	989018	962087	1 000000
7	-7 423905	0 000000	2 522364	973697	230278	0 000000	0 000000	989394	963370	1 000000
8	-7 423905	0 000000	2 546476	977340	213615	0 000000	0 000000	990874	968421	1 000000
9	-7 423905	0 000000	2 558982	975670	168460	0 000000	0 000000	994324	970132	1 004169
10	-7 423905	0 000000	2 565469	974918	111503	0 000000	0 000000	997513	972493	1 007701
11	-7 423905	0 000000	2 568834	972277	059507	0 000000	0 000000	999292	971589	1 010593
12	-7 423905	0 000000	2 570579	968223	027844	0 000000	0 000000	999845	968073	1 012844
13	-7 423905	0 000000	2 571484	964690	012237	0 000000	0 000000	999970	964661	1 014453
14	-7 423905	0 000000	2 571954	962460	004731	0 000000	0 000000	999996	962456	1 015418
15	-7 423905	0 000000	2 572197	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740

J= 2 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6 310319	0 000000	0 000000	974604	233344	0 000000	0 000000	989798	964661	1 000035
2	-6 310319	0 000000	1 238146	976131	230664	0 000000	- 003279	990386	966746	1 000003
3	-6 310319	0 000000	1 880363	977602	228133	0 000000	- 003291	990910	968716	999930
4	-6 310319	0 000000	2 213475	977939	229145	0 000000	- 002075	990941	969080	999823
5	-6 310319	0 000000	2 386257	978629	231069	0 000000	- 001345	991086	969906	999687
6	-6 310319	0 000000	2 475878	978629	232977	0 000000	- 000783	990930	969753	999530
7	-6 310319	0 000000	2 522364	978901	229477	0 000000	- 000530	991151	970238	999641
8	-6 310319	0 000000	2 546476	977764	212653	0 000000	- 000257	991979	969922	1 000942
9	-6 310319	0 000000	2 558982	975617	169062	0 000000	- 000117	994564	970313	1 004433
10	-6 310319	0 000000	2 565469	973153	111467	0 000000	- 000037	996710	969952	1 007619
11	-6 310319	0 000000	2 568834	972408	059457	0 000000	- 000009	997856	970323	1 009087

12	-6 310319	0 000000	2 570579	971765	027861	0 000000	- 000001	998138	969955	1 009639
13	-6 310319	0 000000	2 571484	972035	012197	0 000000	- 000000	998240	970324	1 009630
14	-6 310319	0 000000	2 571954	971649	004699	0 000000	000000	998257	969955	1 009808
15	-6 310319	0 000000	2 572197	972014	0 000000	0 000000	0 000000	998261	970324	1 009660

J= 3 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5 196733	0 000000	0 000000	970735	240096	0 000000	0 000000	987987	959074	999795
2	-5 196733	0 000000	1 238146	973304	234307	0 000000	- 008701	988939	962538	999701
3	-5 196733	0 000000	1 880363	975446	224648	0 000000	- 008979	989652	965352	999542
4	-5 196733	0 000000	2 213475	975352	220124	0 000000	- 005749	989450	965062	999376
5	-5 196733	0 000000	2 386257	976322	218853	0 000000	- 003483	989702	966267	999234
6	-5 196733	0 000000	2 475878	975830	218763	0 000000	- 001875	989425	965511	999156
7	-5 196733	0 000000	2 522364	976118	211010	0 000000	- 001014	990083	966437	999702
8	-5 196733	0 000000	2 546476	974165	187696	0 000000	- 000416	991186	965579	1 001618
9	-5 196733	0 000000	2 558982	972695	141726	0 000000	- 000139	993586	966456	1 004650
10	-5 196733	0 000000	2 565469	970443	087057	0 000000	- 000027	994994	965585	1 007007
11	-5 196733	0 000000	2 568834	970543	042684	0 000000	- 000007	995795	966461	1 007776
12	-5 196733	0 000000	2 570579	969643	018789	0 000000	- 000002	995819	965589	1 008174
13	-5 196733	0 000000	2 571484	970477	007926	0 000000	- 000001	995864	966463	1 007873
14	-5 196733	0 000000	2 571954	969610	003018	0 000000	- 000001	995853	965589	1 008223
15	-5 196733	0 000000	2 572197	970487	0 000000	0 000000	0 000000	995853	966463	1 007858

J= 4 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4 222346	0 000000	0 000000	966854	252145	0 000000	0 000000	986435	953739	999825
2	-4 222346	0 000000	1 238146	971412	242767	0 000000	- 025466	988137	959888	999668
3	-4 222346	0 000000	1 880363	977270	223722	0 000000	- 036709	990315	967805	999465
4	-4 222346	0 000000	2 213475	978589	209976	0 000000	- 038077	990778	969564	999393
5	-4 222346	0 000000	2 386257	981165	202666	0 000000	- 038358	991750	973071	999322
6	-4 222346	0 000000	2 475878	980809	198959	0 000000	- 037823	991708	972677	999425
7	-4 222346	0 000000	2 522364	981764	188984	0 000000	- 036116	992828	974722	1 000164
8	-4 222346	0 000000	2 546476	979526	166416	0 000000	- 031811	993845	973497	1 002102
9	-4 222346	0 000000	2 558982	978764	128862	0 000000	- 024722	996222	975067	1 004813
10	-4 222346	0 000000	2 565469	975904	087060	0 000000	- 016767	997641	973602	1 007422
11	-4 222346	0 000000	2 568834	975961	051562	0 000000	- 009985	999102	975085	1 008873
12	-4 222346	0 000000	2 570579	974068	027231	0 000000	- 005291	999519	973599	1 010079
13	-4 222346	0 000000	2 571484	975320	012716	0 000000	- 002476	999755	975081	1 009799
14	-4 222346	0 000000	2 571954	973807	005022	0 000000	- 000980	999784	973597	1 010455
15	-4 222346	0 000000	2 572197	975283	0 000000	0 000000	0 000000	999793	975081	1 009853

J= 5 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	0 000000	0 000000	956940	289534	0 000000	0 000000	983392	941048	1 000859
2	-3 340757	0 000000	1 063838	962353	280648	0 000000	- 048 24	985357	948261	1 000599
3	-3 340757	0 000000	1 615641	970087	261303	0 000000	- 074186	988377	958811	1 000457
4	-3 340757	0 000000	1 901857	971261	244012	0 000000	- 082984	989236	960806	1 000842
5	-3 340757	0 000000	2 050315	974554	233398	0 000000	- 087147	990735	965525	1 001002
6	-3 340757	0 000000	2 127319	973694	227234	0 000000	- 088305	990781	964718	1 001403
7	-3 340757	0 000000	2 167260	975184	218915	0 000000	- 087064	992200	967578	1 002223
8	-3 340757	0 000000	2 187977	972451	203391	0 000000	- 081845	993137	965777	1 004297
9	-3 340757	0 000000	2 198723	972149	180592	0 000000	- 073300	995806	968072	1 007121
10	-3 340757	0 000000	2 204297	968139	151677	0 000000	- 061904	997787	965997	1 010794
11	-3 340757	0 000000	2 207188	967741	113725	0 000000	- 046577	1 000440	968166	1 013649
12	-3 340757	0 000000	2 208688	964310	070040	0 000000	- 028729	1 001793	966040	1 016462
13	-3 340757	0 000000	2 209465	965814	036017	0 000000	- 014785	1 002456	968186	1 016501
14	-3 340757	0 000000	2 209869	963529	014961	0 000000	- 006144	1 002615	966049	1 017626
15	-3 340757	0 000000	2 210078	965631	0 000000	0 000000	0 000000	1 002652	968191	1 016777

J= 6 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2 412769	0 000000	0 000000	934875	350878	0 000000	0 000000	974548	911080	1 001156
2	-2 412769	0 000000	880355	939514	344556	0 000000	- 061805	975765	916745	1 000424
3	-2 412769	0 000000	1 336987	945587	330693	0 000000	- 094944	977559	924367	999684
4	-2 412769	0 000000	1 573839	945265	316369	0 000000	- 108199	977775	924256	1 000040
5	-2 412769	0 000000	1 696691	948125	306881	0 000000	- 114989	979096	928306	1 000182
6	-2 412769	0 000000	1 760414	946498	300778	0 000000	- 117478	978971	926594	1 000742
7	-2 412769	0 000000	1 793467	948170	294764	0 000000	- 117856	980321	929510	1 001414
8	-2 412769	0 000000	1 810611	945257	284596	0 000000	- 115152	980956	927255	1 003297

9	-2 412769	0 000000	1 819503	945354	269066	0 000000	- 109690	983606	929856	1 005966
10	-2 412769	0 000000	1 824116	939930	238133	0 000000	- 097470	986718	927445	1 011474
11	-2 412769	0 000000	1 826508	937404	179289	0 000000	- 073533	992056	929957	1 018042
12	-2 412769	0 000000	1 827749	931632	108309	0 000000	- 044458	995566	927501	1 024170
13	-2 412769	0 000000	1 828393	932712	055166	0 000000	- 022654	997077	929986	1 025250
14	-2 412769	0 000000	1 828727	929854	022834	0 000000	- 009379	997486	927516	1 026930
15	-2 412769	0 000000	1 828900	932258	0 000000	0 000000	0 000000	997572	929994	1 025959

J= 7 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1 855976	0 000000	0 000000	912895	409508	0 000000	0 000000	965612	881502	1 001462
2	-1 855976	0 000000	770265	918748	402420	0 000000	- 075213	967021	888449	1 000362
3	-1 855976	0 000000	1 169795	927357	386193	0 000000	- 114500	969492	899065	999184
4	-1 855976	0 000000	1 377027	927552	370203	0 000000	- 129147	969951	899680	999573
5	-1 855976	0 000000	1 484517	931199	360548	0 000000	- 136693	971570	904725	999671
6	-1 855976	0 000000	1 540271	929427	354076	0 000000	- 139314	971446	902888	1 000305
7	-1 855976	0 000000	1 569191	931600	349381	0 000000	- 140365	972873	906328	1 000839
8	-1 855976	0 000000	1 584191	928485	341145	0 000000	- 138459	973361	903751	1 002684
9	-1 855976	0 000000	1 591971	928615	326869	0 000000	- 133491	976467	906762	1 005828
10	-1 855976	0 000000	1 596007	921069	287865	0 000000	- 117890	981449	903982	1 014263
11	-1 855976	0 000000	1 598100	916339	210546	0 000000	- 086371	989675	906878	1 024873
12	-1 855976	0 000000	1 599186	908773	123879	0 000000	- 050850	994796	904044	1 033599
13	-1 855976	0 000000	1 599749	909799	062289	0 000000	- 025578	996824	906910	1 035238
14	-1 855976	0 000000	1 600041	906450	025616	0 000000	- 010521	997364	904061	1 037328
15	-1 855976	0 000000	1 600193	909213	0 000000	0 000000	0 000000	997476	906918	1 036182

J= 8 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1 391982	0 000000	0 000000	886313	473702	0 000000	0 000000	954772	846226	1 001993
2	-1 391982	0 000000	678523	891123	463623	0 000000	- 085485	955555	851516	1 000646
3	-1 391982	0 000000	1 030468	900101	452747	0 000000	- 132441	957968	862268	999158
4	-1 391982	0 000000	1 213018	901452	433063	0 000000	- 150506	959135	864614	999776
5	-1 391982	0 000000	1 307706	905331	421414	0 000000	- 159359	961093	870107	1 000097
6	-1 391982	0 000000	1 356819	904084	412629	0 000000	- 162259	961439	869221	1 001009
7	-1 391982	0 000000	1 382294	906166	408196	0 000000	- 163932	962854	872506	1 001561
8	-1 391982	0 000000	1 395508	903504	400502	0 000000	- 162548	963500	870526	1 003412
9	-1 391982	0 000000	1 402361	903075	387184	0 000000	- 158076	966884	873168	1 007128
10	-1 391982	0 000000	1 405916	894079	340729	0 000000	- 139518	974054	870881	1 018669
11	-1 391982	0 000000	1 407760	886695	249333	0 000000	- 102253	984947	873348	1 033482
12	-1 391982	0 000000	1 408717	878053	148023	0 000000	- 060754	991941	870977	1 044907
13	-1 391982	0 000000	1 409213	878041	075052	0 000000	- 030818	994710	873396	1 047829
14	-1 391982	0 000000	1 409470	874958	031007	0 000000	- 012735	995480	871003	1 050117
15	-1 391982	0 000000	1 409604	877235	0 000000	0 000000	0 000000	995639	873410	1 049193

J= 9 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1 113586	0 000000	0 000000	860231	528684	0 000000	0 000000	942824	811046	1 001347
2	-1 113586	0 000000	623478	863176	526739	0 000000	- 090822	942738	813749	999887
3	-1 113586	0 000000	946871	870744	514560	0 000000	- 144555	944296	822240	998049
4	-1 113586	0 000000	1 114613	873232	494040	0 000000	- 168505	945726	825838	998420
5	-1 113586	0 000000	1 201618	877628	482236	0 000000	- 180430	947583	831625	998373
6	-1 113586	0 000000	1 246748	877307	473164	0 000000	- 185076	948108	831782	999073
7	-1 113586	0 000000	1 270156	879498	469475	0 000000	- 187946	949314	834920	999347
8	-1 113586	0 000000	1 282298	877279	461922	0 000000	- 187092	950207	833596	1 001298
9	-1 113586	0 000000	1 288595	876052	447245	0 000000	- 182337	954126	835864	1 005990
10	-1 113586	0 000000	1 291862	866097	397950	0 000000	- 162777	963059	834102	1 020061
11	-1 113586	0 000000	1 293556	855878	297964	0 000000	- 122124	976923	836127	1 039670
12	-1 113586	0 000000	1 294435	845340	181988	0 000000	- 074674	986875	834246	1 055479
13	-1 113586	0 000000	1 294891	843714	093675	0 000000	- 038460	991097	836203	1 060811
14	-1 113586	0 000000	1 295127	840737	038978	0 000000	- 016009	992327	834286	1 063630
15	-1 113586	0 000000	1 295250	842471	0 000000	0 000000	0 000000	992584	836223	1 063029

J= 10 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	- 881589	0 000000	0 000000	836621	577951	0 000000	0 000000	932965	780538	1 001968
2	- 881589	0 000000	577608	836349	581209	0 000000	- 092555	931513	779070	1 000[illegible]
3	- 881589	0 000000	877208	838499	579019	0 000000	- 151001	930785	780462	[illegible]
4	- 881589	0 000000	1 032608	838505	562547	0 000000	- 182028	931473	781045	[illegible]
5	- 881589	0 000000	1 113213	841157	550439	0 000000	- 198128	933227	78[illegible]	1 000[illegible]85

6	- 881589	0 000000	1 155022	840221	540498	0 000000	- 205219	933965	784737	1 001321
7	- 881589	0 000000	1 176708	841840	536150	0 000000	- 209275	935218	787304	1 001892
8	- 881589	0 000000	1 187956	839800	529717	0 000000	- 209750	936029	786077	1 003734
9	- 881589	0 000000	1 193790	838823	519261	0 000000	- 207194	939451	788033	1 007874
10	- 881589	0 000000	1 196817	827923	470988	0 000000	- 188702	949955	786490	1 024488
11	- 881589	0 000000	1 198386	814853	370188	0 000000	- 148711	967392	788282	1 049955
12	- 881589	0 000000	1 199201	800703	235851	0 000000	- 094864	982466	786664	1 073814
13	- 881589	0 000000	1 199623	796754	123685	0 000000	- 049779	989508	788394	1 083651
14	- 881589	0 000000	1 199842	793351	051892	0 000000	- 020892	991651	786728	1 087859
15	- 881589	0 000000	1 199955	794702	0 000000	0 000000	0 000000	992105	788428	1 087617

J= 11 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	- 649592	0 000000	0 000000	800548	644618	0 000000	0 000000	916046	733339	1 001296
2	- 649592	0 000000	533547	795153	655736	0 000000	- 088015	912494	725572	1 000115
3	- 649592	0 000000	810293	786478	672727	0 000000	- 144835	906919	713272	998376
4	- 649592	0 000000	953839	778876	673644	0 000000	- 180360	903723	703888	998730
5	- 649592	0 000000	1 028295	776351	673457	0 000000	- 201123	902509	700664	998684
6	- 649592	0 000000	1 066915	772996	670089	0 000000	- 211817	901842	697120	999677
7	- 649592	0 000000	1 086947	772936	669780	0 000000	- 217961	901982	697175	999863
8	- 649592	0 000000	1 097337	770359	665570	0 000000	- 219998	902593	695321	1 001877
9	- 649592	0 000000	1 102726	767905	654003	0 000000	- 217867	906703	696262	1 007725
10	- 649592	0 000000	1 105522	756573	611825	0 000000	- 204799	918463	694884	1 026883
11	- 649592	0 000000	1 106972	737267	498198	0 000000	- 167131	944224	696146	1 066658
12	- 649592	0 000000	1 107724	716410	315351	0 000000	- 105875	970064	694963	1 108500
13	- 649592	0 000000	1 108114	709050	164466	0 000000	- 055237	981948	696250	1 126724
14	- 649592	0 000000	1 108316	705231	068882	0 000000	- 023139	985538	695032	1 133290
15	- 649592	0 000000	1 108421	705961	0 000000	0 000000	0 000000	986297	696287	1 133692

J= 12 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	- 417595	0 000000	0 000000	763631	710665	0 000000	0 000000	898862	686399	1 001243
2	- 417595	0 000000	502575	753182	729695	0 000000	- 073970	892911	672525	1 000111
3	- 417595	0 000000	763256	732835	767302	0 000000	- 115694	881384	645908	998074
4	- 417595	0 000000	898469	716477	786832	0 000000	- 141788	873373	625751	997973
5	- 417595	0 000000	968603	706749	799120	0 000000	- 156989	868691	613947	998065
6	- 417595	0 000000	1 004981	700093	803204	0 000000	- 165020	866110	606357	998875
7	- 417595	0 000000	1 023850	697338	807123	0 000000	- 169619	865008	603203	999178
8	- 417595	0 000000	1 033637	694384	806028	0 000000	- 171462	864867	600550	1 000712
9	- 417595	0 000000	1 038714	691948	801732	0 000000	- 171608	867360	600168	1 005009
10	- 417595	0 000000	1 041347	677879	753327	0 000000	- 161833	883691	599036	1 032379
11	- 417595	0 000000	1 042713	648488	588319	0 000000	- 126501	924526	599544	1 099407
12	- 417595	0 000000	1 043421	624249	359517	0 000000	- 077314	959410	598911	1 158407
13	- 417595	0 000000	1 043788	615538	184791	0 000000	- 039742	974069	599577	1 182736
14	- 417595	0 000000	1 043979	612203	076922	0 000000	- 016542	978352	598950	1 190521
15	- 417595	0 000000	1 044078	612308	0 000000	0 000000	0 000000	979245	599600	1 191525

J= 13 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	- 185598	0 000000	0 000000	716312	788579	0 000000	0 000000	875450	627096	1 000438
2	- 185598	0 000000	485511	701134	813144	0 000000	- 054405	867534	608257	999922
3	- 185598	0 000000	737342	672040	862390	0 000000	- 075514	851422	572189	998130
4	- 185598	0 000000	867964	650811	892877	0 000000	- 088387	840036	546705	997507
5	- 185598	0 000000	935717	636151	916157	0 000000	- 093720	831673	529069	996618
6	- 185598	0 000000	970860	628791	923857	0 000000	- 096703	828051	520671	996907
7	- 185598	0 000000	989088	623630	932885	0 000000	- 098103	825153	514590	996698
8	- 185598	0 000000	998543	621421	931834	0 000000	- 098685	825276	512844	998262
9	- 185598	0 000000	1 003447	615318	923646	0 000000	- 097783	829631	510487	1 007500
10	- 185598	0 000000	1 005991	598180	858366	0 000000	- 091190	853818	510737	1 048655
11	- 185598	0 000000	1 007310	561685	663913	0 000000	- 070329	907243	509584	1 142685
12	- 185598	0 000000	1 007995	536955	395503	0 000000	- 041814	950810	510542	1 219322
13	- 185598	0 000000	1 008350	526414	200757	0 000000	- 021205	968021	509580	1 251278
14	- 185598	0 000000	1 008534	524767	083271	0 000000	- 008788	972923	510558	1 259192
15	- 185598	0 000000	1 008629	523230	0 000000	0 000000	0 000000	973934	509591	1 261980

J= 14 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0 000000	0 000000	0 000000	679347	845843	0 000000	0 000000	856800	582065	1 000098
2	0 000000	0 000000	481357	658656	877393	0 000000	- 033850	845927	557175	999699

3	0.000000	0.000000	731034	615660	946906	0.000000	-.034787	821739	505912	997694
4	0.000000	0.000000	860538	584343	993332	0.000000	-.030340	804292	469983	997117
5	0.000000	0.000000	927712	571133	1.010564	0.000000	-.027100	797039	455215	997205
6	0.000000	0.000000	962554	558205	1.027104	0.000000	-.024662	790281	441139	997848
7	0.000000	0.000000	980626	557036	1.027430	0.000000	-.023208	789973	440043	998295
8	0.000000	0.000000	990000	550095	1.034663	0.000000	-.022647	787360	433123	999995
9	0.000000	0.000000	994862	548927	1.021031	0.000000	-.021819	794072	435888	1.009378
10	0.000000	0.000000	997384	523760	954147	0.000000	-.020328	822987	431047	1.065958
11	0.000000	0.000000	998692	479691	636447	0.000000	-.012902	906923	435043	1.216706
12	0.000000	0.000000	999371	454491	350727	0.000000	-.006861	947971	430844	1.299525
13	0.000000	0.000000	999723	452451	173703	0.000000	-.003335	961453	435010	1.320381
14	0.000000	0.000000	999905	446448	071190	0.000000	-.001344	965044	430842	1.332413
15	0.000000	0.000000	1.000000	450429	0.000000	0.000000	0.000000	965768	435010	1.328685

J= 15 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	139198	0.000000	0.000000	643561	900186	0.000000	0.000000	838046	539334	999613
2	139198	0.000000	482562	616608	939398	0.000000	-.011515	824104	508149	999950
3	139198	0.000000	732863	570553	1.009500	0.000000	016580	797174	454830	997780
4	139198	0.000000	862692	560038	1.022328	0.000000	014583	791200	443102	997699
5	139198	0.000000	930033	547808	1.041959	0.000000	019117	784037	429502	997436
6	139198	0.000000	964962	547837	1.036187	0.000000	017721	784646	429858	998190
7	139198	0.000000	983080	541997	1.047589	0.000000	018124	781359	423494	998279
8	139198	0.000000	992477	544158	1.037663	0.000000	017981	784357	426814	1.000515
9	139198	0.000000	997351	532529	1.026011	0.000000	017290	792385	421968	1.019528
10	139198	0.000000	999880	499935	861669	0.000000	015164	852238	426064	1.124593
11	139198	0.000000	1.001191	450998	426740	0.000000	007847	934928	421651	1.285607
12	139198	0.000000	1.001871	445719	194514	0.000000	003683	955757	425999	1.320453
13	139198	0.000000	1.002224	439191	087681	0.000000	001701	960045	421643	1.334228
14	139198	0.000000	1.002407	443295	033752	0.000000	000668	960980	425998	1.330569
15	139198	0.000000	1.002502	438683	0.000000	0.000000	0.000000	961142	421643	1.336364

J= 16 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	324796	0.000000	0.000000	596410	969024	0.000000	0.000000	813001	484882	999708
2	324796	0.000000	484456	579956	989070	0.000000	014648	804400	466517	1.000262
3	324796	0.000000	735740	565868	1.012082	0.000000	031271	794502	449583	997720
4	324796	0.000000	866078	580132	998353	0.000000	021310	802376	465485	997625
5	324796	0.000000	933684	565127	1.015055	0.000000	024035	794127	448782	997772
6	324796	0.000000	968750	579765	996573	0.000000	020852	802592	465315	998146
7	324796	0.000000	986939	564588	1.013556	0.000000	021180	794600	448622	998748
8	324796	0.000000	996373	578361	993219	0.000000	020496	804368	465215	1.001326
9	324796	0.000000	1.001267	553299	979494	0.000000	019634	810713	448567	1.027266
10	324796	0.000000	1.003805	522562	743353	0.000000	015606	890203	465187	1.154075
11	324796	0.000000	1.005122	472458	353455	0.000000	007553	949414	448558	1.281475
12	324796	0.000000	1.005805	482549	163697	0.000000	003476	964021	465188	1.290238
13	324796	0.000000	1.006159	463833	073215	0.000000	001562	967071	448560	1.314963
14	324796	0.000000	1.006342	480666	028563	0.000000	000606	967799	465188	1.297321
15	324796	0.000000	1.006438	463426	0.000000	0.000000	0.000000	967921	448560	1.316581

J= 17 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	603192	0.000000	0.000000	557237	1.022830	0.000000	0.000000	791393	440994	999945
2	603192	0.000000	487238	556858	1.021916	0.000000	015091	791270	440625	1.000062
3	603192	0.000000	740055	560469	1.022208	0.000000	015394	791494	443608	997762
4	603192	0.000000	871159	564335	1.022696	0.000000	019077	793457	447776	997490
5	603192	0.000000	939161	560985	1.022386	0.000000	019534	791621	444087	997555
6	603192	0.000000	974433	564551	1.020218	0.000000	020522	794028	448270	998055
7	603192	0.000000	992728	560650	1.020496	0.000000	020569	792096	444089	998392
8	603192	0.000000	1.002218	563604	1.018381	0.000000	020867	795378	448278	1.000424
9	603192	0.000000	1.007140	545528	975235	0.000000	019916	814033	444078	1.037327
10	603192	0.000000	1.009693	498844	701749	0.000000	014822	898620	448271	1.186835
11	603192	0.000000	1.011017	467905	380835	0.000000	008079	949065	444073	1.285976
12	603192	0.000000	1.011704	464816	195789	0.000000	004155	964403	448270	1.310226
13	603192	0.000000	1.012061	458433	092194	0.000000	001956	968672	444072	1.323324
14	603192	0.000000	1.012245	462275	037054	0.000000	000786	969702	448269	1.320317
15	603192	0.000000	1.012341	457852	0.000000	0.000000	0.000000	969901	444071	1.325676

J= 18 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1 206385	0 000000	0 000000	534157	1 054310	0 000000	0 000000	778131	415644	999965
2	1 206385	0 000000	493455	535640	1 051775	0 000000	009685	778964	417244	999926
3	1 206385	0 000000	749406	537388	1 053340	0 000000	013934	778498	418355	998028
4	1 206385	0 000000	882166	536460	1 058377	0 000000	018577	777601	417152	997567
5	1 206385	0 000000	951027	537481	1 054533	0 000000	019655	778286	418314	997687
6	1 206385	0 000000	986745	536207	1 056652	0 000000	020861	777845	417086	998067
7	1 206385	0 000000	1 005271	537405	1 053766	0 000000	021174	778334	418281	997804
8	1 206385	0 000000	1 014881	534040	1 052478	0 000000	021349	780957	417062	1 003686
9	1 206385	0 000000	1 019865	512234	969104	0 000000	019899	816561	418270	1 067091
10	1 206385	0 000000	1 022451	461246	653203	0 000000	013686	904194	417056	1 232221
11	1 206385	0 000000	1 023792	441227	360315	0 000000	007590	947962	418267	1 315001
12	1 206385	0 000000	1 024487	433695	185116	0 000000	003914	961629	417054	1 343178
13	1 206385	0 000000	1 024848	433233	087521	0 000000	001853	965451	418266	1 349092
14	1 206385	0 000000	1 025035	431568	035111	0 000000	000744	966368	417054	1 352455
15	1 206385	0 000000	1 025132	432743	0 000000	0 000000	0 000000	966545	418266	1 351232

J= 19 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1 809577	0 000000	0 000000	517431	1 077323	0 000000	0 000000	768314	397550	999994
2	1 809577	0 000000	499612	517256	1 077206	0 000000	009808	768087	397297	999835
3	1 809577	0 000000	758757	517346	1 080307	0 000000	016116	766855	396729	998162
4	1 809577	0 000000	893173	517298	1 083933	0 000000	019001	766355	396434	997547
5	1 809577	0 000000	962893	517399	1 082023	0 000000	020732	766537	396606	997707
6	1 809577	0 000000	999057	517067	1 082600	0 000000	021362	766450	396306	997849
7	1 809577	0 000000	1 017814	517506	1 082152	0 000000	021934	766311	396571	997329
8	1 809577	0 000000	1 027544	513180	1 073882	0 000000	021772	772205	396280	1 000382
9	1 809577	0 000000	1 032590	483660	950863	0 000000	019815	819918	396561	1 096363
10	1 809577	0 000000	1 035208	436224	617844	0 000000	012948	908417	396274	1 265906
11	1 809577	0 000000	1 036566	418408	337819	0 000000	007122	947780	396558	1 342974
12	1 809577	0 000000	1 037270	412789	172506	0 000000	003648	959987	396272	1 367648
13	1 809577	0 000000	1 037635	411654	081456	0 000000	001725	963328	396558	1 373920
14	1 809577	0 000000	1 037825	411013	032621	0 000000	000692	964133	396272	1 375924
15	1 809577	0 000000	1 037923	411245	0 000000	0 000000	0 000000	964286	396557	1 375833

J= 20 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2 366370	0 000000	0 000000	500183	1 101474	0 000000	0 000000	757969	379124	1 000000
2	2 366370	0 000000	505295	499720	1 101929	0 000000	010930	757472	378524	999714
3	2 366370	0 000000	767388	499967	1 104596	0 000000	016790	756466	378208	998190
4	2 366370	0 000000	903333	500338	1 107434	0 000000	019622	756171	378341	997503
5	2 366370	0 000000	973847	500050	1 106455	0 000000	021326	756100	378088	997640
6	2 366370	0 000000	1 010422	500279	1 106522	0 000000	021918	756126	378274	997492
7	2 366370	0 000000	1 029393	500359	1 107635	0 000000	022501	755570	378056	996694
8	2 366370	0 000000	1 039233	494240	1 091587	0 000000	022188	765327	378255	1 014547
9	2 366370	0 000000	1 044337	458174	942866	0 000000	019567	825117	378047	1 127465
10	2 366370	0 000000	1 046984	414764	589462	0 000000	012377	911966	378250	1 296756
11	2 366370	0 000000	1 048357	398826	318808	0 000000	006728	947895	378045	1 369137
12	2 366370	0 000000	1 049070	394499	162160	0 000000	003431	958809	378249	1 390957
13	2 366370	0 000000	1 049439	393072	076393	0 000000	001618	961768	378044	1 397274
14	2 366370	0 000000	1 049631	392995	030567	0 000000	000648	962477	378249	1 398414
15	2 366370	0 000000	1 049730	392727	0 000000	0 000000	0 000000	962612	378044	1 398991

J= 21 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3 108760	0 000000	0 000000	482406	1 125561	0 000000	0 000000	747150	360430	1 000098
2	3 108760	0 000000	512873	482206	1 125904	0 000000	011287	746740	360082	999716
3	3 108760	0 000000	778896	482648	1 128132	0 000000	017017	745973	360042	998322
4	3 108760	0 000000	916880	482879	1 130748	0 000000	020117	745573	360022	997597
5	3 108760	0 000000	988451	482805	1 130088	0 000000	021767	745551	359956	997629
6	3 108760	0 000000	1 025575	483040	1 130659	0 000000	022466	745228	359975	997002
7	3 108760	0 000000	1 044830	483118	1 131905	0 000000	023004	745013	359929	996649
8	3 108760	0 000000	1 054818	473608	1 104569	0 000000	022533	760037	359960	1 024866
9	3 108760	0 000000	1 059999	432844	920445	0 000000	019157	831527	359922	1 162369
10	3 108760	0 000000	1 062686	393488	562992	0 000000	011839	914782	359956	1 328450
11	3 108760	0 000000	1 064080	379878	392169	0 000000	006380	947460	359919	1 395415
12	3 108760	0 000000	1 064802	376040	153201	0 000000	003242	957223	359955	1 415531

13	3 108760	0 000000	1 065177	374971	072038	0 000000	001526	959857	359919	1 421043
14	3 108760	0 000000	1 065372	374763	028802	0 000000	000611	960485	359954	1 422288
15	3 108760	0 000000	1 065473	374680	0 000000	0 000000	0 000000	960604	359919	1 422592

J= 22 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3 758352	0 000000	0 000000	468486	1 144628	0 000000	0 000000	738443	345950	1 000088
2	3 758352	0 000000	519504	468385	1 144973	0 000000	011365	738061	345697	999657
3	3 758352	0 000000	783966	468794	1 147068	0 000000	017302	737356	345668	998354
4	3 758352	0 000000	928734	468970	1 149469	0 000000	020460	736917	345592	997610
5	3 758352	0 000000	1 001231	469008	1 149132	0 000000	022145	736868	345597	997511
6	3 758352	0 000000	1 038834	469331	1 150223	0 000000	022892	736251	345546	996401
7	3 758352	0 000000	1 058338	469176	1 151071	0 000000	023404	736552	345573	996940
8	3 758352	0 000000	1 068455	456718	1 112911	0 000000	022765	756555	345532	1 035098
9	3 758352	0 000000	1 073703	413214	902117	0 000000	018813	936287	345566	1 190927
10	3 758352	0 000000	1 076425	377021	544963	0 000000	011470	916471	345529	1 353857
11	3 758352	0 000000	1 077836	364905	291673	0 000000	006162	946995	345564	1 417345
12	3 758352	0 000000	1 078569	361400	147723	0 000000	003127	956081	345528	1 436480
13	3 758352	0 000000	1 078948	360514	069429	0 000000	001471	958529	345563	1 441571
14	3 758352	0 000000	1 079145	360258	027751	0 000000	000588	959111	345527	1 442859
15	3 758352	0 000000	1 079248	360253	0 000000	0 000000	0 000000	959222	345563	1 443032

J= 23 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	4 222346	0 000000	0 000000	459347	1 157112	0 000000	0 000000	732683	336556	1 000138
2	4 222346	0 000000	524240	459246	1 157526	0 000000	011464	732288	336301	999687
3	4 222346	0 000000	796159	459596	1 159588	0 000000	017529	731594	336238	998435
4	4 222346	0 000000	937201	459791	1 161814	0 000000	020694	731167	336184	997682
5	4 222346	0 000000	1 010358	459853	1 161766	0 000000	022404	731036	336169	997450
6	4 222346	0 000000	1 048305	460298	1 163202	0 000000	023173	730265	336139	996012
7	4 222346	0 000000	1 067987	459776	1 163310	0 000000	023661	731108	336146	997616
8	4 222346	0 000000	1 078196	445369	1 117201	0 000000	022891	754716	336127	1 043027
9	4 222346	0 000000	1 083491	400673	891051	0 000000	018603	838936	336140	1 209519
10	4 222346	0 000000	1 086238	366412	534961	0 000000	011267	917336	336123	1 370694
11	4 222346	0 000000	1 087663	355042	286107	0 000000	006046	946756	336138	1 432604
12	4 222346	0 000000	1 088402	351773	144832	0 000000	003066	955507	336122	1 451204
13	4 222346	0 000000	1 088785	350925	068053	0 000000	001442	957862	336137	1 456187
14	4 222346	0 000000	1 088984	350703	027197	0 000000	000577	958422	336122	1 457408
15	4 222346	0 000000	1 089087	350680	0 000000	0 000000	0 000000	958529	336137	1 457608

GENERALIZED FORCES FROM DIRECT INTEGRATION OF WALL SURFACE STRESSES

0 7 2612E+00 0 4 4406E+01 3 2614E-04

FINAL PRINTED OUTPUT FOR TEST CASE NO. 3 FLOWFIELD DATA AT STEP 500

NC=500 TIME= 16 5115 DT= .5500E-01 MAXIMUM DELTAQ/Q= 5 248E-02AT J,K,L,N=13, 9, 9, 2
GF= 1.8220E-02-7.2197E+00-2.2707E+01-4 3906E+01-1 2344E-03 CW= 9 7738E-01

J= 1 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7.423905	0.000000	0 000000	971593	239387	0 000000	0 000000	988539	960457	1.000000
2	-7.423905	0.000000	1 238146	972041	237476	0 000000	0 000000	988721	961077	1.000000
3	-7.423905	0.000000	1 880363	973159	232638	0 000000	0 000000	989176	962625	1.000000
4	-7 423905	0 000000	2 213475	974497	226720	0 000000	0 000000	989720	964479	1 000000
5	-7 423905	0 000000	2 386257	975792	220842	0 000000	0 000000	990246	966274	1 000000
6	-7 423905	0 000000	2 475878	977258	214005	0 000000	0 000000	990840	968307	1 000000
7	-7 423905	0 000000	2 522364	979256	204326	0 000000	0 000000	991650	971079	1 000000
8	-7 423905	0 000000	2 546476	980755	196759	0 000000	0 000000	992257	973161	1 000000
9	-7 423905	0 000000	2 556982	976595	162769	0 000000	0 000000	994701	971420	1 004169
10	-7 423905	0 000000	2 565469	972388	132717	0 000000	0 000000	996477	968962	1 007701
11	-7 423905	0 000000	2 568834	969435	096896	0 000000	0 000000	998122	967615	1 010593
12	-7 423905	0 000000	2 570579	966858	059952	0 000000	0 000000	999281	966163	1 012844
13	-7 423905	0 000000	2 571484	964320	030280	0 000000	0 000000	999817	964144	1 014453
14	-7 423905	0 000000	2 571954	962403	011852	0 000000	0 000000	999972	962376	1 015418
15	-7 423905	0 000000	2 572197	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740

J= 1 K= 2 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7 423905	1 670379	0 000000	972008	237614	0 000000	0 000000	988708	961032	1 000000
2	-7 423905	1 670379	1 238146	972452	235709	0 000000	0 000000	988888	961646	1 000000
3	-7 423905	1 670379	1 880363	973559	230884	0 000000	0 000000	989339	963179	1 000000
4	-7 423905	1 670379	2 213475	974883	224983	0 000000	0 000000	989876	965014	1 000000
5	-7 423905	1 670379	2 386257	976164	219128	0 000000	0 000000	990397	966790	1 000000
6	-7 423905	1 670379	2 475878	977610	212329	0 000000	0 000000	990983	968796	1 000000
7	-7 423905	1 670379	2 522364	979578	202725	0 000000	0 000000	991781	971526	1 000000
8	-7 423905	1 670379	2 546476	981031	195336	0 000000	0 000000	992369	973545	1 000000
9	-7 423905	1 670379	2 556982	976791	161535	0 000000	0 000000	994781	971694	1 004169
10	-7 423905	1 670379	2 565469	972506	131804	0 000000	0 000000	996526	969127	1 007701
11	-7 423905	1 670379	2 568834	969489	096320	0 000000	0 000000	998144	967690	1 010593
12	-7 423905	1 670379	2 570579	966875	059671	0 000000	0 000000	999288	966186	1 012844
13	-7 423905	1 670379	2 571484	964323	030184	0 000000	0 000000	999818	964147	1 014453
14	-7 423905	1 670379	2 571954	962403	011827	0 000000	0 000000	999972	962376	1 015418
15	-7 423905	1 670379	2 572197	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740

J= 1 K= 3 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7 423905	3 246102	0 000000	973394	231608	0 000000	0 000000	989272	962951	1 000000
2	-7 423905	3 246102	1 238146	973826	229706	0 000000	0 000000	989447	963549	1 000000
3	-7 423905	3 246102	1 880363	974904	224891	0 000000	0 000000	989885	965042	1 000000
4	-7 423905	3 246102	2 213475	976189	219012	0 000000	0 000000	990407	966824	1 000000
5	-7 423905	3 246102	2 386257	977426	213207	0 000000	0 000000	990909	968540	1 000000
6	-7 423905	3 246102	2 475878	978810	205527	0 000000	0 000000	991469	970460	1 000000
7	-7 423905	3 246102	2 522364	980678	197156	0 000000	0 000000	992226	973054	1 000000
8	-7 423905	3 246102	2 546476	981983	190344	0 000000	0 000000	992754	974867	1 000000
9	-7 423905	3 246102	2 556982	977479	157140	0 000000	0 000000	995061	972652	1 004169
10	-7 423905	3 246102	2 565469	972930	128462	0 000000	0 000000	996699	969719	1 007701
11	-7 423905	3 246102	2 568834	969695	094096	0 000000	0 000000	998229	967978	1 010593
12	-7 423905	3 246102	2 570579	966943	058476	0 000000	0 000000	999316	966282	1 012844
13	-7 423905	3 246102	2 571484	964337	029702	0 000000	0 000000	999824	964167	1 014453
14	-7 423905	3 246102	2 571954	962405	011678	0 000000	0 000000	999973	962379	1 015418
15	-7.423905	3 246102	2 572197	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740

J= 1 K= 4 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7 423905	3 555807	0 000000	975918	220265	0 000000	0 000000	990297	966448	1 000000
2	-7 423905	3 555807	1 238146	976334	218339	0 000000	0 000000	990466	967025	1 000000
3	-7 423905	3 555807	1 880363	977370	213476	0 000000	0 000000	990886	968461	1 000000
4	-7 423905	3 555807	2 213475	978597	207568	0 000000	0 000000	991383	970164	1 000000
5	-7 423905	3 555807	2 386257	979759	201816	0 000000	0 000000	991854	971778	1 000000
6	-7 423905	3 555807	2 475878	981031	195337	0 000000	0 000000	992369	973544	1 000000
7	-7 423905	3 555807	2 522364	982723	186371	0 000000	0 000000	993053	975896	1 000000
8	-7 423905	3 555807	2 546476	983775	180581	0 000000	0 000000	993478	977359	1 000000
9	-7 423905	3.555807	2 556982	978806	148302	0 000000	0 000000	995601	974500	1.004169

10	-7.423905	3.555807	2.565469	.973787	.121436	0.000000	0.000000	.997051	.970915	1.007701
11	-7.423905	3.555807	2.568834	.970142	.089068	0.000000	0.000000	.998413	.968603	1.010593
12	-7.423905	3.555807	2.570579	.967111	.055436	0.000000	0.000000	.999385	.966.16	1.012844
13	-7.423905	3.555807	2.571484	.964378	.028250	0.000000	0.000000	.999840	.964224	1.014453
14	-7.423905	3.555807	2.571954	.962411	.011174	0.000000	0.000000	.999975	.962386	1.015418
15	-7.423905	3.555807	2.572197	.961708	0.000000	0.000000	0.000000	1.000000	.961708	1.015740

J= 1 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7.423905	3.659714	0.000000	.978232	.209343	0.000000	0.000000	.991235	.969657	1.000000
2	-7.423905	3.659714	1.238146	.978626	.207425	0.000000	0.000000	.991395	.970205	1.000000
3	-7.423905	3.659714	1.880363	.979602	.202605	0.000000	0.000000	.991790	.971559	1.000000
4	-7.423905	3.659714	2.213475	.980742	.196826	0.000000	0.000000	.992252	.973143	1.000000
5	-7.423905	3.659714	2.386257	.981790	.191364	0.000000	0.000000	.992676	.974600	1.000000
6	-7.423905	3.659714	2.475878	.982892	.185457	0.000000	0.000000	.993121	.976130	1.000000
7	-7.423905	3.659714	2.522364	.984333	.177435	0.000000	0.000000	.993703	.978135	1.000000
8	-7.423905	3.659714	2.546476	.985099	.173022	0.000000	0.000000	.994013	.979201	1.000000
9	-7.423905	3.659714	2.558982	.979817	.141198	0.000000	0.000000	.996013	.975910	1.004169
10	-7.423905	3.659714	2.565469	.974486	.115392	0.000000	0.000000	.997337	.971891	1.007701
11	-7.423905	3.659714	2.568834	.970516	.084643	0.000000	0.000000	.998567	.969125	1.010593
12	-7.423905	3.659714	2.570579	.967245	.052862	0.000000	0.000000	.999441	.966705	1.012844
13	-7.423905	3.659714	2.571484	.964410	.027040	0.000000	0.000000	.999854	.964269	1.014453
14	-7.423905	3.659714	2.571954	.962417	.010594	0.000000	0.000000	.999978	.962395	1.015418
15	-7.423905	3.659714	2.572197	.961708	0.000000	0.000000	0.000000	1.000000	.961708	1.015740

J= 1 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7.423905	3.694574	0.000000	.972507	.165734	0.000000	0.000000	.994506	.967165	1.005658
2	-7.423905	3.694574	1.238146	.972829	.163734	0.000000	0.000000	.994638	.967613	1.005658
3	-7.423905	3.694574	1.880363	.973615	.158756	0.000000	0.000000	.994959	.968707	1.005658
4	-7.423905	3.694574	2.213475	.974503	.152933	0.000000	0.000000	.995322	.969944	1.005658
5	-7.423905	3.694574	2.386257	.975269	.147726	0.000000	0.000000	.995635	.971013	1.005658
6	-7.423905	3.694574	2.475878	.976013	.142498	0.000000	0.000000	.995939	.972049	1.005658
7	-7.423905	3.694574	2.522364	.976966	.135501	0.000000	0.000000	.996328	.973379	1.005658
8	-7.423905	3.694574	2.546476	.977514	.131315	0.000000	0.000000	.996551	.974143	1.005658
9	-7.423905	3.694574	2.558982	.973760	.108105	0.000000	0.000000	.997663	.971484	1.008330
10	-7.423905	3.694574	2.565469	.970124	.089280	0.000000	0.000000	.998406	.968577	1.010593
11	-7.423905	3.694574	2.568834	.967463	.065679	0.000000	0.000000	.999137	.966628	1.012445
12	-7.423905	3.694574	2.570579	.965293	.041137	0.000000	0.000000	.999662	.964967	1.013886
13	-7.423905	3.694574	2.571484	.963442	.021346	0.000000	0.000000	.999909	.963354	1.014916
14	-7.423905	3.694574	2.571954	.962160	.008706	0.000000	0.000000	.999985	.962145	1.015534
15	-7.423905	3.694574	2.572197	.961708	0.000000	0.000000	0.000000	1.000000	.961708	1.015740

J= 1 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7.423905	3.706270	0.000000	.967388	.127310	0.000000	0.000000	.996758	.964252	1.010066
2	-7.423905	3.706270	1.238146	.967617	.125444	0.000000	0.000000	.996853	.964572	1.010066
3	-7.423905	3.706270	1.880363	.968162	.120885	0.000000	0.000000	.997077	.965333	1.010066
4	-7.423905	3.706270	2.213475	.968749	.115782	0.000000	0.000000	.997319	.966151	1.010066
5	-7.423905	3.706270	2.386257	.969210	.111608	0.000000	0.000000	.997509	.966795	1.010066
6	-7.423905	3.706270	2.475878	.969606	.107893	0.000000	0.000000	.997672	.967348	1.010066
7	-7.423905	3.706270	2.522364	.970105	.103022	0.000000	0.000000	.997877	.968046	1.010066
8	-7.423905	3.706270	2.546476	.970444	.099577	0.000000	0.000000	.998017	.968520	1.010066
9	-7.423905	3.706270	2.558982	.968280	.083328	0.000000	0.000000	.998611	.966935	1.011570
10	-7.423905	3.706270	2.565469	.966291	.069044	0.000000	0.000000	.999047	.965370	1.012844
11	-7.423905	3.706270	2.568834	.964855	.050994	0.000000	0.000000	.999480	.964353	1.013886
12	-7.423905	3.706270	2.570579	.963676	.032382	0.000000	0.000000	.999790	.963474	1.014697
13	-7.423905	3.706270	2.571484	.962664	.017164	0.000000	0.000000	.999941	.962608	1.015277
14	-7.423905	3.706270	2.571954	.961958	.007071	0.000000	0.000000	.999990	.961949	1.015624
15	-7.423905	3.706270	2.572197	.961708	0.000000	0.000000	0.000000	1.000000	.961708	1.015740

J= 1 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7.423905	3.710194	0.000000	.964645	.079587	0.000000	0.000000	.998733	.963423	1.013217
2	-7.423905	3.710194	1.238146	.964760	.078078	0.000000	0.000000	.998781	.963583	1.013217
3	-7.423905	3.710194	1.880363	.965023	.074509	0.000000	0.000000	.998890	.963951	1.013217
4	-7.423905	3.710194	2.213475	.965283	.070795	0.000000	0.000000	.998998	.964316	1.013217
5	-7.423905	3.710194	2.386257	.965461	.068148	0.000000	0.000000	.999071	.964564	1.013217
6	-7.423905	3.710194	2.475878	.965590	.066156	0.000000	0.000000	.999125	.964745	1.013217

7	-7 423905	3 710194	2 522364	965754	063544	0 000000	0 000000	999192	964974	1 013217
8	-7 423905	3 710194	2 546476	965877	061508	0 000000	0 000000	999243	965146	1 013217
9	-7 423905	3 710194	2 558982	964792	052258	0 000000	0 000000	999454	964265	1 013886
10	-7 423905	3 710194	2 565469	963846	043603	0 000000	0 000000	999620	963479	1 014453
11	-7 423905	3 710194	2 568834	963154	032469	0 000000	0 000000	999789	962951	1 014916
12	-7 423905	3 710194	2 570579	962593	021060	0 000000	0 000000	999911	962507	1 015277
13	-7 423905	3 710194	2 571484	962132	011563	0 000000	0 000000	999973	962106	1 015534
14	-7 423905	3 710194	2 571954	961818	004934	0 000000	0 000000	999995	961814	1 015689
15	-7 423905	3 710194	2 572197	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740

J= 1 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7 423905	3 711511	0 000000	962716	031815	0 000000	0 000000	999798	962521	1 015109
2	-7 423905	3 711511	1 238146	962740	031002	0 000000	0 000000	999808	962555	1 015109
3	-7 423905	3 711511	1 880363	962793	029187	0 000000	0 000000	999830	962629	1 015109
4	-7 423905	3 711511	2 213475	962838	027536	0 000000	0 000000	999848	962692	1 015109
5	-7 423905	3 711511	2 386257	962862	026621	0 000000	0 000000	999858	962726	1 015109
6	-7 423905	3 711511	2 475878	962875	026101	0 000000	0 000000	999864	962744	1 015109
7	-7 423905	3 711511	2 522364	962894	025355	0 000000	0 000000	999871	962770	1 015109
8	-7 423905	3 711511	2 546476	962910	024662	0 000000	0 000000	999878	962793	1 015109
9	-7 423905	3 711511	2 558932	962581	021629	0 000000	0 000000	999906	962491	1 015277
10	-7 423905	3 711511	2 565469	962306	018494	0 000000	0 000000	999932	962240	1 015418
11	-7 423905	3 711511	2 568834	962099	014234	0 000000	0 000000	999959	962060	1 015534
12	-7 423905	3 711511	2 570579	961937	009708	0 000000	0 000000	999981	961919	1 015624
13	-7 423905	3 711511	2 571484	961814	005708	0 000000	0 000000	999993	961808	1 015689
14	-7 423905	3 711511	2 571954	961735	002609	0 000000	0 000000	999999	961734	1 015727
15	-7 423905	3 711511	2 572197	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740

J= 1 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7 423905	3 711952	0 000000	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
2	-7 423905	3 711952	1 238146	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
3	-7 423905	3 711952	1 880363	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
4	-7 423905	3 711952	2 213475	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
5	-7 423905	3 711952	2 386257	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
6	-7 423905	3 711952	2 475878	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
7	-7 423905	3 711952	2 522364	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
8	-7 423905	3 711952	2 546476	961709	0 000000	0 000000	0 000000	1 000000	961708	1 015740
9	-7 423905	3 711952	2 558982	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
10	-7 423905	3 711952	2 565469	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
11	-7 423905	3 711952	2 568834	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
12	-7 423905	3 711952	2 570579	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
13	-7 423905	3 711952	2 571484	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
14	-7 423905	3 711952	2 571954	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740
15	-7 423905	3 711952	2 572197	961708	0 000000	0 000000	0 000000	1 000000	961708	1 015740

J= 2 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6 310319	0 000000	0 000000	964885	241392	0 000000	0 000000	984113	949555	998285
2	-6 310319	0 000000	1 238146	965357	239291	0 000000	000371	984291	950192	998271
3	-6 310319	0 000000	1 880363	966410	234132	0 000000	000777	984686	951611	998236
4	-6 310319	0 000000	2 213475	967630	228122	0 000000	001029	985166	953276	998218
5	-6 310319	0 000000	2 386257	968911	222464	0 000000	000767	985767	955121	998300
6	-6 310319	0 000000	2 475878	969855	216310	0 000000	000405	986462	956725	998614
7	-6 310319	0 000000	2 522364	969300	207516	0 000000	000153	987200	957387	999383
8	-6 310319	0 000000	2 546476	969151	192954	0 000000	000167	988515	958020	1 000982
9	-6 310319	0 000000	2 558982	967203	167991	0 000000	000119	990505	958019	1 003806
10	-6 310319	0 000000	2 565469	965171	134957	0 000000	000057	992905	958323	1 007085
11	-6 310319	0 000000	2 568834	963078	096941	0 000000	000039	994881	958148	1 009966
12	-6 310319	0 000000	2 570579	961972	059736	0 000000	000021	996255	958369	1 011825
13	-6 310319	0 000000	2 571484	961240	030567	0 000000	000011	996798	958162	1 012686
14	-6 310319	0 000000	2 571954	961266	012315	0 000000	000004	996990	958372	1 012869
15	-6 310319	0 000000	2 572197	961026	0 000000	0 000000	0 000000	997021	958163	1 013002

J= 2 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6 310319	1 670379	0 000000	964924	239789	- 000379	0 000000	984222	949699	998379
2	-6 310319	1 670379	1 238146	965386	237697	- 000359	000369	984397	950323	998366
3	-6 310319	1 670379	1 880363	966413	232557	- 000300	000781	984785	951709	998335

4	-6 310319	1 670379	2 213475	967608	226567	- 000217	001039	985259	953344	998322
5	-6 310319	1 670379	2 386257	968877	220924	- 000131	000774	985859	955177	998406
6	-6 310319	1 670379	2 475878	969816	214799	- 000055	000409	986551	956774	998720
7	-6 310319	1 670379	2 522364	969760	206069	000013	000156	987283	957428	999484
8	-6 310319	1 670379	2 546476	969119	191632	000077	000169	988590	959061	1 001072
9	-6 310319	1 670379	2 558982	967181	166864	000142	000120	990566	958057	1 003877
10	-6 310319	1 670379	2 565469	965166	134101	000196	000057	992950	958361	1 007133
11	-6 310319	1 670379	2 568834	963084	096395	000215	000040	994913	958185	1 009996
12	-6 310319	1 670379	2 570579	961986	059466	000177	000021	996280	958408	1 011845
13	-6 310319	1 670379	2 571484	961254	030465	000103	000011	996821	958199	1 012703
14	-6 310319	1 670379	2 571954	961283	012283	000042	000005	997013	958411	1 012885
15	-6 310319	1 670379	2 572197	961040	0 000000	0 000000	0 000000	997044	958199	1 013019

J= 2 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6 310319	3 246102	0 000000	964953	234398	- 000679	0 000000	984583	950076	998734
2	-6 310319	3 246102	1 238146	965394	232314	- 000653	000325	984754	950676	998725
3	-6 310319	3 246102	1 880363	966361	227197	- 000573	000734	985127	951988	998704
4	-6 310319	3 246102	2 213475	967472	221237	- 000437	001022	985579	953520	998703
5	-6 310319	3 246102	2 386257	968681	215635	- 000275	000778	986163	955278	998795
6	-6 310319	3 246102	2 475878	969596	209603	- 000125	000417	986843	956839	999106
7	-6 310319	3 246102	2 522364	969536	201090	000002	000162	987554	957469	999850
8	-6 310319	3 246102	2 546476	968921	187058	000117	000175	988828	958095	1 001395
9	-6 310319	3 246102	2 558982	967023	162911	000228	000124	990754	958082	1 004132
10	-6 310319	3 246102	2 565469	965065	131017	000317	000059	993083	958389	1 007309
11	-6 310319	3 246102	2 568834	963027	094330	000345	000041	994995	958207	1 010103
12	-6 310319	3 246102	2 570579	961960	058345	000281	000021	996335	958435	1 011911
13	-6 310319	3 246102	2 571484	961234	029981	000164	000012	996865	958221	1 012756
14	-6 310319	3 246102	2 571954	961269	012112	000068	000005	997055	958438	1 012934
15	-6 310319	3 246102	2 572197	961023	0 000000	0 000000	0 000000	997086	958222	1 013069

J= 2 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6 310319	3 555807	0 000000	964587	223731	- 000766	0 000000	985247	950357	999559
2	-6 310319	3 555807	1 238146	965026	221626	- 000757	000154	985423	950960	999556
3	-6 310319	3 555807	1 880363	965964	216467	- 000703	000480	985800	952246	999550
4	-6 310319	3 555807	2 213475	966983	210488	- 000563	000807	986230	953668	999564
5	-6 310319	3 555807	2 386257	968072	204938	- 000349	000668	986773	955267	999664
6	-6 310319	3 555807	2 475878	968913	199099	- 000125	000386	987411	956716	999963
7	-6 310319	3 555807	2 522364	968845	191018	000066	000156	988074	957290	1 000663
8	-6 310319	3 555807	2 546476	968280	177766	000223	000180	989276	957895	1 002114
9	-6 310319	3 555807	2 558982	966476	154773	000356	000128	991092	957867	1 004703
10	-6 310319	3 555807	2 565469	964641	124497	000453	000061	993296	958174	1 007703
11	-6 310319	3 555807	2 568834	962709	089746	000473	000042	995095	957987	1 010337
12	-6 310319	3 555807	2 570579	961713	055652	000391	000021	996365	958217	1 012047
13	-6 310319	3 555807	2 571484	961010	028690	000244	000011	996868	958000	1 012853
14	-6 310319	3 555807	2 571954	961055	011619	000110	000004	997050	958220	1 013019
15	-6 310319	3 555807	2 572197	960806	0 000000	0 000000	0 000000	997080	958000	1 013154

J= 2 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6 310319	3 659714	0 000000	963742	205551	- 000101	0 000000	986531	950761	1 001213
2	-6 310319	3 659714	1 238146	964187	203404	- 000099	- 000181	986715	951378	1 001214
3	-6 310319	3 659714	1 880363	965138	198160	- 000078	- 000075	987107	952695	1 001218
4	-6 310319	3 659714	2 213475	966149	192146	000001	000218	987545	954115	1 001242
5	-6 310319	3 659714	2 386257	967192	186715	000153	000211	988067	955650	1 001340
6	-6 310319	3 659714	2 475878	967974	181244	000367	000124	988654	956991	1 001611
7	-6 310319	3 659714	2 522364	967899	173909	000592	000047	989235	957479	1 002230
8	-6 310319	3 659714	2 546476	967421	161953	000805	000147	990304	958041	1 003511
9	-6 310319	3 659714	2 558982	965804	140927	000939	000125	991908	957989	1 005810
10	-6 310319	3 659714	2 565469	964203	113340	001044	000064	993865	958288	1 008463
11	-6 310319	3 659714	2 568834	962482	081780	001040	000046	995443	958095	1 010786
12	-6 310319	3 659714	2 570579	961622	050848	000960	000024	996573	958326	1 012295
13	-6 310319	3 659714	2 571484	960975	026316	000742	000012	997016	958107	1 013018
14	-6 310319	3 659714	2 571954	961037	010687	000428	000004	997182	958329	1 013161
15	-6 310319	3 659714	2 572197	960790	0 000000	0 000000	0 000000	997208	958108	1 013292

J= 2 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT

1	-6	310319	3	694574	0	000000	961126	173426	000001	0	000000	988621	950190	1	004426
2	-6	310319	3	694574	1	238146	961564	171264	000003	-	000662	988798	950792	1	004422
3	-6	310319	3	694574	1	880363	962500	166022	000015	-	000900	989175	952081	1	004414
4	-6	310319	3	694574	2	213475	963516	160136	000048	-	000745	989595	953490	1	004417
5	-6	310319	3	694574	2	386257	964592	155074	000109	-	000701	990104	955046	1	004484
6	-6	310319	3	694574	2	475878	965414	150313	000203	-	000605	990653	956391	1	004699
7	-6	310319	3	694574	2	522364	965406	144169	000346	-	000420	991138	956851	1	005194
8	-6	310319	3	694574	2	546476	965085	134262	000569	-	000146	991986	957351	1	006188
9	-6	310319	3	694574	2	558982	963872	117085	000731	-	000039	993188	957306	1	007914
10	-6	310319	3	694574	2	565469	962705	094403	000862	-	000014	994663	957567	1	00990
11	-6	310319	3	694574	2	568834	961402	068309	000871		000007	995835	957397	1	011638
12	-6	310319	3	694574	2	570579	960786	042691	000829		000009	996683	957599	1	012760
13	-6	310319	3	694574	2	571484	960283	022292	000653		000007	997005	957407	1	013298
14	-6	310319	3	694574	2	571954	960359	009131	000376		000004	997128	957601	1	013392
15	-6	310319	3	694574	2	572197	960146	0 000000	0 000000	0	000000	997148	957407	1	013502

J= 2 K= 7

L	X		Y		Z		R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6	310319	3	706270	0	000000	959046	130154	- 000027	0 000000	991368	950767	1 008090
2	-6	310319	3	706270	1	238146	959503	128123	- 000026	- 001157	991537	951383	1 008069
3	-6	310319	3	706270	1	880363	960486	123274	- 000021	- 001770	991892	952698	1 008017
4	-6	310319	3	706270	2	213475	961543	118040	- 000009	- 001803	992277	954117	1 007965
5	-6	310319	3	706270	2	386257	962639	113887	000014	- 001783	992740	955650	1 007976
6	-6	310319	3	706270	2	475878	963503	110368	000047	- 001617	993236	956986	1 008118
7	-6	310319	3	706270	2	522364	963601	106039	000096	- 001289	993624	957457	1 008471
8	-6	310319	3	706270	2	546476	963505	099020	000192	- 000759	994246	957961	1 009142
9	-6	310319	3	706270	2	558982	962696	086818	000320	- 000392	994997	957880	1 010244
10	-6	310319	3	706270	2	565469	962035	070439	000470	- 000174	995956	958144	1 011495
11	-6	310319	3	706270	2	568834	961158	051365	000536	- 000063	996664	957951	1 012584
12	-6	310319	3	706270	2	570579	960844	032504	000549	- 000017	997216	958168	1 013277
13	-6	310319	3	706270	2	571484	960461	017283	000474	000000	997394	957958	1 013619
14	-6	310319	3	706270	2	571954	960592	007190	000287	000004	997478	958170	1 013650
15	-6	310319	3	706270	2	572197	960370	0 000000	0 000000	0	000000	997489	957958	1	013754

J= 2 K= 8

L	X		Y		Z		R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6	310319	3	710194	0	000000	956687	079246	- 000000	0 000000	993211	950193	1 010959
2	-6	310319	3	710194	1	238146	957152	077653	000000	- 001311	993359	950795	1 010913
3	-6	310319	3	710194	1	880363	958156	073959	000002	- 002102	993662	952083	1 010797
4	-6	310319	3	710194	2	213475	959250	070237	000006	- 002332	993998	953492	1 010678
5	-6	310319	3	710194	2	386257	960396	067642	000012	- 002490	994430	955047	1 010634
6	-6	310319	3	710194	2	475878	961298	065744	000020	- 002431	994894	956389	1 010726
7	-6	310319	3	710194	2	522364	961454	063494	000033	- 002130	995209	956849	1 010981
8	-6	310319	3	710194	2	546476	961513	059716	000062	- 001591	995665	957345	1 011419
9	-6	310319	3	710194	2	558982	961044	052936	000100	- 001064	996095	957292	1 012054
10	-6	310319	3	710194	2	565469	960750	043536	000168	- 000589	996654	957535	1 012745
11	-6	310319	3	710194	2	568834	960226	032295	000239	- 000278	997013	957358	1 013331
12	-6	310319	3	710194	2	570579	960123	020987	000261	- 000111	997325	957555	1 013692
13	-6	310319	3	710194	2	571484	959860	011573	000215	- 000029	997398	957363	1 013877
14	-6	310319	3	710194	2	571954	960007	004968	000136	- 000002	997447	957556	1 013865
15	-6	310319	3	710194	2	572197	959809	0 000000	0 000000	0	000000	997452	957363	1	013953

J= 2 K= 9

L	X		Y		Z		R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6	310319	3	711511	0	000000	956277	032124	- 000001	0 000000	994238	950767	1 012178
2	-6	310319	3	711511	1	238146	956764	031301	- 000000	- 000825	994375	951383	1 012112
3	-6	310319	3	711511	1	880363	957816	029478	000001	- 001381	994656	952698	1 011952
4	-6	310319	3	711511	2	213475	958942	027831	000002	- 001668	994968	954116	1 011794
5	-6	310319	3	711511	2	386257	960085	026894	000005	- 001994	995380	955650	1 011731
6	-6	310319	3	711511	2	475878	960990	026330	000007	- 002128	995833	956986	1 011810
7	-6	310319	3	711511	2	522364	961176	025649	000007	- 002016	996130	957456	1 012034
8	-6	310319	3	711511	2	546476	961301	024389	000008	- 001614	996525	957961	1 012382
9	-6	310319	3	711511	2	558982	960946	021999	000007	- 001202	996809	957879	1 012820
10	-6	310319	3	711511	2	565469	960836	018557	000008	- 000776	997196	958142	1 013260
11	-6	310319	3	711511	2	568834	960453	014246	000007	- 000400	997391	957948	1 013620
12	-6	310319	3	711511	2	570579	960467	009702	000008	- 000146	997601	958163	1 013327
13	-6	310319	3	711511	2	571484	960239	005701	000007	- 000044	997618	957952	1 013941
14	-6	310319	3	711511	2	571954	960418	002600	000008	000004	997652	958164	1 013900

15	-6.310319	3.711511	2 572197	960205	0 000000	0 000000	0 000000	997653	957951	1 013990

J= 2 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6 310319	3 711952	0 000000	955571	0 000000	0 000000	0 000000	994371	950193	1 012612
2	-6 310319	3 711952	1 238146	956049	0 000000	0 000000	0 000000	994504	950795	1 012546
3	-6 310319	3 711952	1 880363	957082	0 000000	0 000000	0 000000	994777	952083	1 012386
4	-6 310319	3 711952	2 213475	958204	0 000000	0 000000	0 000000	995083	953492	1 012223
5	-6 310319	3 711952	2 386257	959368	0 000000	0 000000	0 000000	995495	955047	1 012150
6	-6 310319	3 711952	2 475878	960282	0 000000	0 000000	0 000000	995946	956390	1 012223
7	-6 310319	3 711952	2 522364	960463	0 000000	0 000000	0 000000	996238	956849	1 012444
8	-6 310319	3 711952	2 546476	960592	0 000000	0 000000	0 000000	996622	957347	1 012779
9	-6 310319	3 711952	2 558982	960285	0 000000	0 000000	0 000000	996887	957295	1 013178
10	-6 310319	3 711952	2 565469	960188	0 000000	0 000000	0 000000	997243	957540	1 013581
11	-6 310319	3 711952	2 568834	959845	0 000000	0 000000	0 000000	997415	957363	1 013900
12	-6 310319	3 711952	2 570579	959857	0 000000	0 000000	0 000000	997605	957559	1 014089
13	-6 310319	3 711952	2 571484	959652	0 000000	0 000000	0 000000	997615	957363	1 014186
14	-6 310319	3 711952	2 571954	959817	0 000000	0 000000	0 000000	997644	957556	1 014146
15	-6 310319	3 711952	2 572197	960011	0 000000	0 000000	0 000000	997648	957754	1 014068

J= 3 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5 196733	0 000000	0 000000	961332	245792	0 000000	0 000000	981526	943572	997132
2	-5 196733	0 000000	1 238146	962744	242184	0 000000	- 006847	982137	945546	997166
3	-5 196733	0 000000	1 880363	964753	233272	0 000000	- 010556	983064	948414	997276
4	-5 196733	0 000000	2 213475	963956	222808	0 000000	- 009342	982971	947541	997512
5	-5 196733	0 000000	2 386257	961277	213037	0 000000	- 005784	982346	944307	997988
6	-5 196733	0 000000	2 475878	959307	203484	0 000000	- 003348	982425	942448	998887
7	-5 196733	0 000000	2 522364	957391	192027	0 000000	- 001798	983139	941249	1 000413
8	-5 196733	0 000000	2 546476	955405	175472	0 000000	- 000917	984562	940656	1 002693
9	-5 196733	0 000000	2 558982	953267	152411	0 000000	- 000463	986446	940346	1 005512
10	-5 196733	0 000000	2 565469	951049	120995	0 000000	- 000229	988638	940244	1 008687
11	-5 196733	0 000000	2 568834	949123	084457	0 000000	- 000111	990577	940180	1 011484
12	-5 196733	0 000000	2 570579	947993	049611	0 000000	- 000052	991767	940188	1 013182
13	-5 196733	0 000000	2 571484	947569	023915	0 000000	- 000022	992187	940165	1 013792
14	-5 196733	0 000000	2 571954	947511	009209	0 000000	- 000008	992269	940185	1 013901
15	-5 196733	0 000000	2 572197	947477	0 000000	0 000000	0 000000	992282	940165	1 013930

J= 3 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5 196733	1 670379	0 000000	961120	244202	- 000242	0 000000	981639	943472	997334
2	-5 196733	1 670379	1 238146	962507	240618	- 000167	- 006805	982240	945413	997370
3	-5 196733	1 670379	1 880363	964464	231767	000037	- 010470	983149	948212	997482
4	-5 196733	1 670379	2 213475	963645	221370	000313	- 009250	983050	947311	997720
5	-5 196733	1 670379	2 386257	960992	211654	000592	- 005732	982435	944111	998196
6	-5 196733	1 670379	2 475878	959042	202159	000834	- 003322	982516	942274	999089
7	-5 196733	1 670379	2 522364	957140	190786	001034	- 001784	983220	941079	1 000600
8	-5 196733	1 670379	2 546476	955178	174363	001193	- 000911	984629	940496	1 002856
9	-5 196733	1 670379	2 558982	953063	151506	001308	- 000460	986486	940184	1 005640
10	-5 196733	1 670379	2 565469	950876	120354	001341	- 000228	988653	940086	1 008775
11	-5 196733	1 670379	2 568834	948969	084107	001227	- 000111	990567	940018	1 011540
12	-5 196733	1 670379	2 570579	947855	049497	000930	- 000052	991746	940031	1 013220
13	-5 196733	1 670379	2 571484	947431	023916	000543	- 000022	992161	940004	1 013825
14	-5 196733	1 670379	2 571954	947377	009227	000229	- 000008	992243	940028	1 013932
15	-5 196733	1 670379	2 572197	947339	0 000000	0 000000	0 000000	992256	940003	1 013962

J= 3 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5 196733	3 246102	0 000000	960479	238641	- 000404	0 000000	982073	943260	998041
2	-5 196733	3 246102	1 238146	961820	235107	- 000306	- 006787	982659	945141	998080
3	-5 196733	3 246102	1 880363	963658	226391	- 000014	- 010373	983527	947784	998199
4	-5 196733	3 246102	2 213475	962746	216173	000428	- 009086	983394	946759	998442
5	-5 196733	3 246102	2 386257	960121	206639	000910	- 005609	982784	943591	998913
6	-5 196733	3 246102	2 475878	958242	197351	001341	- 003263	982868	941826	999782
7	-5 196733	3 246102	2 522364	956390	186273	001700	- 001751	983542	940649	1 001242
8	-5 196733	3 246102	2 546476	954507	170293	001989	- 000898	984899	940093	1 003413
9	-5 196733	3 246102	2 558982	952473	148100	002197	- 000454	986672	939779	1 006078
10	-5 196733	3 246102	2 565469	950388	117811	002256	- 000226	988748	939694	1 009079
11	-5 196733	3 246102	2 568834	948554	082535	002054	- 000110	990579	939617	1 011729

12	-5 196733	3 246102	2 570579	947492	048778	001538	- 000052	991712	939639	1 013341
13	-5 196733	3 246102	2 571484	947076	023699	000883	- 000022	992109	939603	1 013924
14	-5 196733	3 246102	2 571954	947034	009185	000368	- 000008	992189	939637	1 014024
15	-5 196733	3 246102	2 572197	946988	0 000000	0 000000	0 000000	992202	939603	1 014057

J= 3 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5 196733	3 555807	0 000000	959280	226978	- 000342	0 000000	983014	942986	999497
2	-5 196733	3 555807	1 238146	960636	223466	- 000296	- 007033	983610	944892	999538
3	-5 196733	3 555807	1 880363	962477	214844	- 000111	- 010684	984486	947545	999663
4	-5 196733	3 555807	2 213475	961532	204829	000261	- 009277	984338	946472	999905
5	-5 196733	3 555807	2 386257	958945	195609	000723	- 005690	983717	943331	1 000352
6	-5 196733	3 555807	2 475878	957201	186757	001142	- 003331	983801	941694	1 001166
7	-5 196733	3 555807	2 522364	955477	176298	001505	- 001799	984424	940594	1 002522
8	-5 196733	3 555807	2 546476	953739	161206	001822	- 000930	985675	940077	1 004527
9	-5 196733	3 555807	2 558982	951881	140309	002058	- 000475	987290	939783	1 006959
10	-5 196733	3 555807	2 565469	949984	111692	002118	- 000238	989180	939706	1 009692
11	-5 196733	3 555807	2 568834	948314	078351	001865	- 000116	990845	939633	1 012104
12	-5 196733	3 555807	2 570579	947352	046432	001273	- 000054	991876	939655	1 013567
13	-5 196733	3 555807	2 571484	946974	022652	000597	- 000022	992233	939619	1 014094
14	-5 196733	3 555807	2 571954	946941	008811	000181	- 000008	992303	939653	1 014180
15	-5 196733	3 555807	2 572197	946896	0 000000	0 000000	0 000000	992315	939619	1 014211

J= 3 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5 196733	3 659714	0 000000	957611	206705	- 000119	0 000000	984635	942898	1 001842
2	-5 196733	3 659714	1 238146	959001	203189	- 000113	- 007609	985244	944850	1 001881
3	-5 196733	3 659714	1 880363	960929	194608	- 000062	- 011574	986150	947621	1 001997
4	-5 196733	3 659714	2 213475	960091	184786	000088	- 010119	986021	946670	1 002216
5	-5 196733	3 659714	2 386257	957639	176005	000306	- 006292	985403	943660	1 002612
6	-5 196733	3 659714	2 475878	956004	167876	000505	- 003743	985469	942200	1 003327
7	-5 196733	3 659714	2 522364	95[illegible]	158483	000670	- 002088	986018	941252	1 004515
8	-5 196733	3 659714	2 546476	953102	144915	000846	- 001113	987107	940814	1 006255
9	-5 196733	3 659714	2 558982	951519	126171	000991	- 000577	988484	940561	1 008329
10	-5 196733	3 659714	2 565469	949916	100338	001002	- 000286	990086	940498	1 010646
11	-5 196733	3 659714	2 568834	948507	070246	000740	- 000135	991490	940435	1 012680
12	-5 196733	3 659714	2 570579	947706	041544	000226	- 000059	992351	940457	1 013902
13	-5 196733	3 659714	2 571484	947394	020249	- 000235	- 000023	992644	940425	1 014334
14	-5 196733	3 659714	2 571954	947374	007881	- 000290	- 000007	992698	940456	1 014398
15	-5 196733	3 659714	2 572197	947334	0 000000	0 000000	0 000000	992707	940425	1 014424

J= 3 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5 196733	3 694574	0 000000	955595	176069	- 000091	0 000000	986759	942942	1 004851
2	-5 196733	3 694574	1 238146	956966	172608	- 000084	- 008303	987348	944859	1 004874
3	-5 196733	3 694574	1 880363	958863	164231	- 000056	- 012677	988201	947549	1 004946
4	-5 196733	3 694574	2 213475	958024	154851	000010	- 011224	988004	946532	1 005098
5	-5 196733	3 694574	2 386257	955624	146840	000104	- 007107	987307	943494	1 005396
6	-5 196733	3 694574	2 475878	954195	139901	000194	- 004240	987272	942050	1 005963
7	-5 196733	3 694574	2 522364	952925	132263	000237	- 002394	987678	941183	1 006913
8	-5 196733	3 694574	2 546476	951733	121188	000219	- 001320	988543	940829	1 008299
9	-5 196733	3 694574	2 558982	950470	105453	000163	- 000699	989635	940619	1 009950
10	-5 196733	3 694574	2 565469	949224	083587	000056	- 000341	990896	940583	1 011767
11	-5 196733	3 694574	2 568834	948131	058188	- 000180	- 000145	991978	940526	1 013339
12	-5 196733	3 694574	2 570579	947529	034175	- 000497	- 000056	992640	940555	1 014273
13	-5 196733	3 694574	2 571484	947282	016560	- 000680	- 000020	992862	940520	1 014605
14	-5 196733	3 694574	2 571954	947276	006425	- 000487	- 000007	992904	940555	1 014651
15	-5 196733	3 694574	2 572197	947235	0 000000	0 000000	0 000000	992911	940520	1 014676

J= 3 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5 196733	3 706270	0 000000	953199	132166	- 000032	0 000000	989215	942919	1 008364
2	-5 196733	3 706270	1 238146	954618	128954	- 000029	- 008523	989790	944871	1 008350
3	-5 196733	3 706270	1 880363	956633	121286	- 000022	- 013005	990600	947640	1 008324
4	-5 196733	3 706270	2 213475	955930	112997	- 000010	- 011490	990333	946689	1 008348
5	-5 196733	3 706270	2 386257	953655	106393	000005	- 007187	989543	943683	1 008506
6	-5 196733	3 706270	2 475878	952345	101215	000021	- 004099	989387	942238	1 008901
7	-5 196733	3 706270	2 522364	951224	095957	000035	- 002083	989603	941334	1 009597
8	-5 196733	3 706270	2 546476	950295	088304	000031	- 000994	990197	940979	1 010598

9	-5.196733	3.706270	2 558982	949380	076949	- 000053	- 000455	990963	940801	1 011770
10	-5.196733	3 706270	2 565469	948532	060818	- 000247	- 000189	991828	940780	1 013014
11	-5.196733	3 706270	2 568834	947802	041972	- 000473	- 000059	992546	940737	1 014060
12	-5 196733	3 706270	2 570579	947416	024345	- 000588	- 000011	992981	940766	1 014670
13	-5 196733	3 706270	2 571484	947249	011682	- 000578	- 000004	993126	940738	1 014889
14	-5 196733	3 706270	2 571954	947254	004527	- 000361	- 000007	993153	940768	1 014915
15	-5.196733	3 706270	2 572197	947219	0 000000	0 000000	0 000000	993158	940738	1 014935

J= 3 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5.196733	3.710194	0 000000	951276	079470	- 000011	0 000000	991238	942941	1 011242
2	-5 196733	3 710194	1 238146	952699	076938	- 000009	- 007173	991770	944858	1 011180
3	-5 196733	3 710194	1 880363	954735	071028	- 000007	- 010790	992474	947549	1 011034
4	-5 196733	3 710194	2 213475	954085	064973	- 000008	- 009114	992085	946533	1 010913
5	-5 196733	3 710194	2 386257	951883	060578	- 000011	- 005185	991190	943497	1 010936
6	-5 196733	3 710194	2 475878	950667	057551	- 000014	- 002607	990943	942056	1 011200
7	-5 196733	3 710194	2 522364	949696	054856	- 000019	- 000955	991047	941194	1 011720
8	-5 196733	3 710194	2 546476	948960	050906	- 000031	- 000018	991448	940844	1 012443
9	-5 196733	3 710194	2 558982	948280	044586	- 000053	000389	991948	940645	1 013245
10	-5 196733	3 710194	2 565469	947745	035154	- 000115	000382	992489	940627	1 014026
11	-5 196733	3 710194	2 568834	947305	023963	- 000259	000239	992906	940586	1 014641
12	-5 196733	3 710194	2 570579	947099	013632	- 000357	000087	993157	940618	1 014986
13	-5 196733	3 710194	2 571484	946994	006408	- 000283	000028	993236	940589	1 015112
14	-5 196733	3 710194	2 571954	947011	002472	- 000159	- 000022	993251	940620	1 015119
15	-5 196733	3 710194	2 572197	946978	0 000000	0 000000	0 000000	993254	940590	1 015137

J= 3 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5 196733	3.711511	0 000000	950437	031620	- 000002	0 000000	992091	942919	1 012470
2	-5 196733	3 711511	1 238146	951905	030271	- 000001	- 003811	992611	944871	1 012375
3	-5 196733	3 711511	1 880363	954049	027229	- 000001	- 005558	993283	947640	1 012149
4	-5 196733	3 711511	2 213475	953508	024357	- 000006	- 004126	992849	946689	1 011936
5	-5 196733	3 711511	2 386257	951377	022511	- 000010	- 001602	991913	943683	1 011889
6	-5 196733	3 711511	2 475878	950195	021372	- 000011	- 000257	991628	942240	1 012100
7	-5 196733	3 711511	2 522364	949236	020487	- 000013	000530	991679	941338	1 012562
8	-5 196733	3 711511	2 546476	948564	019191	- 000013	000835	992011	940986	1 013188
9	-5 196733	3 711511	2 558982	947994	016930	- 000013	000878	992421	940809	1 013850
10	-5 196733	3 711511	2 565469	947581	013323	- 000013	000785	992828	940785	1 014443
11	-5 196733	3 711511	2 568834	947258	008881	- 000013	000507	993115	940737	1 014874
12	-5 196733	3 711511	2 570579	947125	004884	- 000013	000177	993287	940767	1 015107
13	-5 196733	3 711511	2 571484	947046	002256	- 000013	000046	993339	940738	1 015194
14	-5 196733	3 711511	2 571954	947070	000884	- 000013	- 000006	993347	940769	1 015192
15	-5 196733	3.711511	2 572197	947038	0 000000	0 000000	0 000000	993348	940739	1 015207

J= 3 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5.196733	3 711952	0 000000	950305	0 000000	0 000000	0 000000	992251	942941	1 012690
2	-5 196733	3 711952	1 238146	951743	0 000000	0 000000	0 000000	992765	944858	1 012602
3	-5 196733	3 711952	1 880363	953823	0 000000	0 000000	0 000000	993423	947549	1 012388
4	-5 196733	3 711952	2 213475	953234	0 000000	0 000000	0 000000	992970	946533	1 012177
5	-5 196733	3 711952	2 386257	951087	0 000000	0 000000	0 000000	992020	943497	1 012121
6	-5 196733	3 711952	2 475878	949919	0 000000	0 000000	0 000000	991724	942057	1 012316
7	-5 196733	3 711952	2 522364	949003	0 000000	0 000000	0 000000	991773	941196	1 012757
8	-5 196733	3 711952	2 546476	948343	0 000000	0 000000	0 000000	992097	940848	1 013370
9	-5 196733	3 711952	2 558982	947766	0 000000	0 000000	0 000000	992495	940653	1 014023
10	-5 196733	3 711952	2 565469	947377	0 000000	0 000000	0 000000	992888	940639	1 014591
11	-5 196733	3 711952	2 568834	947077	0 000000	0 000000	0 000000	993158	940597	1 014996
12	-5 196733	3 711952	2 570579	946950	0 000000	0 000000	0 000000	993319	940623	1 015215
13	-5 196733	3 711952	2 571484	946872	0 000000	0 000000	0 000000	993365	940589	1 015295
14	-5 196733	3 711952	2 571954	946900	0 000000	0 000000	0 000000	993366	940618	1 015285
15	-5 196733	3 711952	2 572197	946969	0 000000	0 000000	0 000000	993357	940678	1 015246

J= 4 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4 222346	0.000000	0 000000	957930	260127	0 000000	0 000000	980047	938817	997042
2	-4 222346	0.000000	1 238146	961547	254781	0 000000	- 021623	981604	943859	997121
3	-4 222346	0 000000	1 880363	968087	241512	0 000000	- 036568	984536	953116	997392
4	-4 222346	0 000000	2 213475	970196	225728	0 000000	- 040968	985999	956612	998005
5	-4 222346	0 000000	2 386257	968889	210521	0 000000	- 039330	986514	955822	999065

6	-4.222346	0.000000	2.475878	.968161	.196235	0.000000	-.037551	.987748	.956299	1.000615
7	-4.222346	0.000000	2.522364	.966720	.182001	0.000000	-.035073	.989255	.956333	1.002739
8	-4.222346	0.000000	2.546476	.964917	.165181	0.000000	-.031987	.991206	.956432	1.005468
9	-4.222346	0.000000	2.558982	.962658	.143431	0.000000	-.027847	.993442	.956345	1.008681
10	-4.222346	0.000000	2.565469	.960343	.114543	0.000000	-.022289	.995889	.956395	1.012139
11	-4.222346	0.000000	2.568834	.958213	.079930	0.000000	-.015575	.998002	.956298	1.015188
12	-4.222346	0.000000	2.570579	.956990	.045840	0.000000	-.008941	.999342	.956360	1.017071
13	-4.222346	0.000000	2.571484	.956452	.020832	0.000000	-.004065	.999821	.956281	1.017787
14	-4.222346	0.000000	2.571954	.956414	.007438	0.000000	-.001452	.999936	.956353	1.017921
15	-4.222346	0.000000	2.572197	.956321	0.000000	0.000000	0.000000	.999955	.956278	1.017979

J= 4 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4.222346	1.670379	0.000000	.957520	.258517	.000219	0.000000	.980179	.938541	.997347
2	-4.222346	1.670379	1.238146	.961089	.253214	.000370	-.021494	.981716	.943517	.997426
3	-4.222346	1.670379	1.880363	.967523	.240049	.000778	-.036315	.984607	.952630	.997696
4	-4.222346	1.670379	2.213475	.969579	.224377	.001326	-.040666	.986046	.956049	.998375
5	-4.222346	1.670379	2.386257	.968299	.209263	.001876	-.039069	.986563	.955288	.999358
6	-4.222346	1.670379	2.475878	.967590	.195069	.002346	-.037318	.987789	.955775	1.000893
7	-4.222346	1.670379	2.522364	.966161	.180940	.002711	-.034862	.989276	.955800	1.002993
8	-4.222346	1.670379	2.546476	.964388	.164261	.002968	-.031806	.991204	.955906	1.005686
9	-4.222346	1.670379	2.558982	.962158	.142707	.003100	-.027705	.993405	.955812	1.008853
10	-4.222346	1.670379	2.565469	.959884	.114063	.003033	-.022195	.995816	.955868	1.012259
11	-4.222346	1.670379	2.568834	.957780	.079708	.002660	-.015531	.997896	.955766	1.015264
12	-4.222346	1.670379	2.570579	.956680	.045814	.001953	-.008936	.999221	.955834	1.017122
13	-4.222346	1.670379	2.571484	.956042	.020884	.001126	-.004075	.999693	.955748	1.017831
14	-4.222346	1.670379	2.571954	.956011	.007478	.000479	-.001460	.999808	.955827	1.017961
15	-4.222346	1.670379	2.572197	.955912	0.000000	0.000000	0.000000	.999826	.955746	1.018022

J= 4 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4.222346	3.246102	0.000000	.956481	.252777	.000269	0.000000	.980743	.938062	.998355
2	-4.222346	3.246102	1.238146	.959948	.247579	.000481	-.021298	.982238	.942897	.998430
3	-4.222346	3.246102	1.880363	.966106	.234696	.001107	-.035808	.985013	.951626	.998693
4	-4.222346	3.246102	2.213475	.967899	.219385	.002051	-.039873	.986332	.954669	.999289
5	-4.222346	3.246102	2.386257	.966564	.204609	.003092	-.038207	.986794	.953799	1.000309
6	-4.222346	3.246102	2.475878	.965898	.190742	.004018	-.036501	.987984	.954292	1.001792
7	-4.222346	3.246102	2.522364	.964508	.176987	.004748	-.034096	.989406	.954290	1.003812
8	-4.222346	3.246102	2.546476	.962825	.160783	.005265	-.031133	.991255	.954405	1.006390
9	-4.222346	3.246102	2.558982	.960691	.139865	.005540	-.027153	.993344	.954297	1.009407
10	-4.222346	3.246102	2.565469	.958544	.112015	.005444	-.021798	.995641	.954366	1.012647
11	-4.222346	3.246102	2.568834	.956532	.078522	.004794	-.015301	.997615	.954250	1.015508
12	-4.222346	3.246102	2.570579	.955400	.045363	.003548	-.008848	.998882	.954333	1.017279
13	-4.222346	3.246102	2.571484	.954873	.020830	.002074	-.004065	.999331	.954234	1.017961
14	-4.222346	3.246102	2.571954	.954858	.007514	.000896	-.001467	.999443	.954326	1.018081
15	-4.222346	3.246102	2.572197	.954746	0.000000	0.000000	0.000000	.999460	.954231	1.018147

J= 4 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4.222346	3.555807	0.000000	.955100	.240627	.000167	0.000000	.982053	.937959	1.000266
2	-4.222346	3.555807	1.238146	.958578	.235527	.000293	-.021473	.983546	.942805	1.000331
3	-4.222346	3.555807	1.880363	.964658	.222963	.000771	-.035798	.986270	.951413	1.000568
4	-4.222346	3.555807	2.213475	.966197	.208195	.001703	-.039275	.987448	.954069	1.001124
5	-4.222346	3.555807	2.386257	.964624	.194105	.002933	-.037003	.987743	.952800	1.002076
6	-4.222346	3.555807	2.475878	.963915	.180975	.004147	-.035002	.988808	.953126	1.003451
7	-4.222346	3.555807	2.522364	.962586	.168031	.005177	-.032536	.990099	.953055	1.005317
8	-4.222346	3.555807	2.546476	.961035	.152788	.005943	-.029662	.991791	.953146	1.007684
9	-4.222346	3.555807	2.558982	.959082	.133081	.006378	-.025872	.993685	.953026	1.010430
10	-4.222346	3.555807	2.565469	.957145	.106720	.006321	-.020786	.995768	.953094	1.013368
11	-4.222346	3.555807	2.568834	.955317	.074924	.005572	-.014608	.997550	.952977	1.015957
12	-4.222346	3.555807	2.570579	.954305	.043386	.004119	-.008466	.998697	.953061	1.017557
13	-4.222346	3.555807	2.571484	.953820	.019999	.002420	-.003904	.999099	.952961	1.018174
14	-4.222346	3.555807	2.571954	.953818	.007247	.001061	-.001415	.999200	.953055	1.018278
15	-4.222346	3.555807	2.572197	.953705	0.000000	0.000000	0.000000	.999217	.952958	1.018343

J= 4 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4.222346	3.659714	0.000000	.953171	.219843	.000038	0.000000	.984092	.938007	1.003153
2	-4.222346	3.659714	1.238146	.956723	.214822	.000070	-.022120	.985600	.942946	1.003197

3	-4 222346	3 659714	1 880363	962982	202546	000232	- 036621	988353	951765	1 003378
4	-4 222346	3 659714	2 213475	964677	188383	000645	- 039578	989518	954566	1 003855
5	-4 222346	3 659714	2 386257	963165	175264	001353	- 036327	989718	953262	1 004688
6	-4 222346	3 659714	2 475878	962490	163407	002298	- 033406	990626	953467	1 005892
7	-4 222346	3 659714	2 522364	961257	151946	003342	- 030385	991721	953298	1 007520
8	-4 222346	3 659714	2 546476	959888	138374	004247	- 027342	993178	953340	1 009576
9	-4 222346	3 659714	2 558982	958185	120604	004831	- 023667	994794	953196	1 011937
10	-4 222346	3 659714	2 565469	956541	096567	004894	- 018901	996568	953258	1 014438
11	-4 222346	3 659714	2 568834	954986	067509	004263	- 013196	998063	953136	1 016621
12	-4 222346	3 659714	2 570579	954154	038791	002991	- 007579	999023	953222	1 017954
13	-4 222346	3 659714	2 571484	953739	017664	001598	- 003450	999350	953119	1 018465
14	-4 222346	3 659714	2 571954	953756	006308	000633	- 001231	999434	953215	1 018543
15	-4 222346	3 659714	2 572197	953644	0 000000	0 000000	0 000000	999447	953116	1 018603

J= 4 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4 222346	3 694574	0 000000	950666	188343	000020	0 000000	986652	937976	1 006822
2	-4 222346	3 694574	1 238146	954183	183479	000043	- 022670	988115	942843	1 006827
3	-4 222346	3 694574	1 880363	960387	171689	000130	- 037337	990763	951516	1 006911
4	-4 222346	3 694574	2 213475	962135	158400	000302	- 039917	991818	954264	1 007251
5	-4 222346	3 694574	2 386257	960832	146631	000565	- 035875	991922	953071	1 007903
6	-4 222346	3 694574	2 475878	960401	136666	000943	- 031973	992695	953385	1 008869
7	-4 222346	3 694574	2 522364	959380	127598	001498	- 028035	993566	953207	1 010184
8	-4 222346	3 694574	2 546476	958262	116714	002180	- 024437	994741	953222	1 011850
9	-4 222346	3 694574	2 558982	956863	101771	002757	- 020619	996028	953062	1 013752
10	-4 222346	3 694574	2 565469	955569	081026	002975	- 016112	997432	953115	1 015730
11	-4 222346	3 694574	2 568834	954355	055950	002694	- 011008	998573	952993	1 017409
12	-4 222346	3 694574	2 570579	953747	031506	001923	- 006170	999298	953077	1 018408
13	-4 222346	3 694574	2 571484	953417	013912	001018	- 002720	999537	952976	1 018792
14	-4 222346	3 694574	2 571954	953451	004789	000402	- 000935	999600	953070	1 018842
15	-4 222346	3 694574	2 572197	953345	0 000000	0 000000	0 000000	999610	952973	1 018898

J= 4 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4 222346	3 706270	0 000000	947895	143300	000001	0 000000	989559	937998	1 010968
2	-4 222346	3 706270	1 238146	951489	138854	000011	- 021801	991009	942935	1 010918
3	-4 222346	3 706270	1 880363	957875	128229	000041	- 035657	993601	951745	1 010854
4	-4 222346	3 706270	2 213475	959793	116670	000087	- 037490	994526	954539	1 010986
5	-4 222346	3 706270	2 386257	958587	107045	000156	- 032859	994427	953245	1 011394
6	-4 222346	3 706270	2 475878	958286	099618	000269	- 028618	994986	953481	1 012090
7	-4 222346	3 706270	2 522364	957511	093635	000447	- 024433	995637	953333	1 013079
8	-4 222346	3 706270	2 546476	956681	086425	000695	- 020538	996528	953359	1 014338
9	-4 222346	3 706270	2 558982	955611	075524	000953	- 016615	997466	953189	1 015747
10	-4 222346	3 706270	2 565469	954710	059471	001142	- 012405	998462	953241	1 017145
11	-4 222346	3 706270	2 568834	953878	039984	001232	- 008027	999201	953115	1 018253
12	-4 222346	3 706270	2 570579	953523	021508	001171	- 004218	999663	953201	1 018876
13	-4 222346	3 706270	2 571484	953285	008817	000769	- 001725	999802	953097	1 019119
14	-4 222346	3 706270	2 571954	953342	002742	000314	- 000536	999846	953194	1 019139
15	-4 222346	3 706270	2 572197	953235	0 000000	0 000000	0 000000	999852	953094	1 019191

J= 4 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4 222346	3 710194	0 000000	945537	087187	000000	0 000000	992004	937977	1 014477
2	-4 222346	3 710194	1 238146	949103	083710	000005	- 017356	993405	942844	1 014380
3	-4 222346	3 710194	1 880363	955468	075563	000016	- 028088	995864	951517	1 014176
4	-4 222346	3 710194	2 213475	957500	067113	000023	- 028708	996621	954264	1 014085
5	-4 222346	3 710194	2 386257	956538	060573	000028	- 024385	996376	953071	1 014243
6	-4 222346	3 710194	2 475878	956451	056068	000043	- 020975	996795	953385	1 014707
7	-4 222346	3 710194	2 522364	955814	053194	000080	- 017559	997275	953209	1 015466
8	-4 222346	3 710194	2 546476	955173	049778	000140	- 014387	997964	953228	1 016441
9	-4 222346	3 710194	2 558982	954373	043676	000185	- 011211	998635	953070	1 017465
10	-4 222346	3 710194	2 565469	953810	033704	000145	- 007974	999283	953126	1 018366
11	-4 222346	3 710194	2 568834	953321	021350	000144	- 004795	999672	953009	1 018971
12	-4 222346	3 710194	2 570579	953184	010017	000507	- 002182	999903	953091	1 019265
13	-4 222346	3 710194	2 571484	953036	002963	000758	- 000623	999954	952993	1 01938
14	-4 222346	3 710194	2 571954	953106	000407	000320	- 000104	999977	953084	1 019374
15	-4 222346	3 710194	2 572197	953008	0 000000	0 000000	0 000000	999981	952990	1 019420

J= 4 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4 222346	3 711511	0 000000	944498	034445	- 000000	0 000000	993118	937998	1 016062
2	-4 222346	3 711511	1 238146	948123	032584	000001	- 008919	994527	942934	1 015947
3	-4 222346	3 711511	1 880363	954628	028336	000004	- 014247	996980	951745	1 015671
4	-4 222346	3 711511	2 213475	956782	024228	000001	- 013803	997655	954538	1 015443
5	-4 222346	3 711511	2 386257	955844	021236	- 000002	- 011076	997281	953245	1 015459
6	-4 222346	3 711511	2 475878	955778	019271	- 000000	- 009611	997599	953483	1 015811
7	-4 222346	3 711511	2 522364	955227	018369	- 000001	- 008001	998020	953336	1 016475
8	-4 222346	3 711511	2 546476	954662	017453	- 000001	- 006344	998638	953362	1 017345
9	-4 222346	3 711511	2 558982	953951	015300	- 000001	- 004662	999202	953190	1 018223
10	-4 222346	3 711511	2 565469	953527	011179	- 000001	- 003189	999700	953241	1 018912
11	-4 222346	3 711511	2 568834	953187	006082	- 000002	- 002081	999934	953125	1 019295
12	-4 222346	3 711511	2 570579	953165	001756	- 000002	- 000938	1 000062	953224	1 019435
13	-4 222346	3 711511	2 571484	953054	- 000610	- 000002	- 000013	1 000068	953118	1 019489
14	-4 222346	3 711511	2 571954	953140	- 000889	- 000002	000174	1 000081	953218	1 019465
15	-4 222346	3 711511	2 572197	953037	0 000000	0 000000	0 000000	1 000082	953115	1 019510

J= 4 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4 222346	3 711952	0 000000	944301	0 000000	0 000000	0 000000	993302	937976	1 016335
2	-4 222346	3 711952	1 238146	947859	0 000000	0 000000	0 000000	994709	942843	1 016245
3	-4 222346	3 711952	1 880363	954236	0 000000	0 000000	0 000000	997150	951516	1 016010
4	-4 222346	3 711952	2 213475	956368	0 000000	0 000000	0 000000	997800	954265	1 015766
5	-4 222346	3 711952	2 386257	955551	0 000000	0 000000	0 000000	997406	953072	1 015712
6	-4 222346	3 711952	2 475878	955578	0 000000	0 000000	0 000000	997708	953388	1 016008
7	-4 222346	3 711952	2 522364	955019	0 000000	0 000000	0 000000	998112	953215	1 016657
8	-4 222346	3 711952	2 546476	954463	0 000000	0 000000	0 000000	998718	953239	1 017511
9	-4 222346	3 711952	2 558982	953783	0 000000	0 000000	0 000000	999269	953087	1 018363
10	-4 222346	3 711952	2 565469	953379	0 000000	0 000000	0 000000	999748	953139	1 019024
11	-4 222346	3 711952	2 568834	953041	0 000000	0 000000	0 000000	999965	953008	1 019389
12	-4 222346	3 711952	2 570579	953003	0 000000	0 000000	0 000000	1 000077	953076	1 019519
13	-4 222346	3 711952	2 571484	952908	0 000000	0 000000	0 000000	1 000072	952977	1 019556
14	-4 222346	3 711952	2 571954	952995	0 000000	0 000000	0 000000	1 000076	953068	1 019523
15	-4 222346	3 711952	2 572197	953016	0 000000	0 000000	0 000000	1 000079	953091	1 019517

J= 5 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	0 000000	0 000000	949740	292038	0 000000	0 000000	977984	928830	998366
2	-3 340757	0 000000	1 063838	955769	285953	0 000000	- 040076	980457	937091	998360
3	-3 340757	0 000000	1 615641	957379	271118	0 000000	- 069086	985362	953219	998521
4	-3 340757	0 000000	1 901857	97[illegible]36	253888	0 000000	- 081444	988555	962128	999329
5	-3 340757	0 000000	2 050315	974787	236846	0 000000	- 084019	990720	965740	1 000891
6	-3 340757	0 000000	2 127319	976066	220727	0 000000	- 083853	993322	969548	1 002994
7	-3 340757	0 000000	2 167260	975163	205907	0 000000	- 080864	995562	970836	1 005628
8	-3 340757	0 000000	2 187977	973821	189883	0 000000	- 076111	998191	972059	1 008839
9	-3 340757	0 000000	2 198723	971225	169454	0 000000	- 068629	1 000917	972115	1 012675
10	-3 340757	0 000000	2 204297	968717	141134	0 000000	- 057521	1 004055	972645	1 016901
11	-3 340757	0 000000	2 207188	965878	104171	0 000000	- 042585	1 006716	972365	1 020794
12	-3 340757	0 000000	2 208688	964472	064217	0 000000	- 026298	1 008570	972737	1 023270
13	-3 340757	0 000000	2 209465	963517	032170	0 000000	- 013184	1 009213	972393	1 024328
14	-3 340757	0 000000	2 209869	963680	012794	0 000000	- 005246	1 009407	972745	1 024456
15	-3 340757	0 000000	2 210078	963303	0 000000	0 000000	0 000000	1 009439	972396	1 024648

J= 5 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	1 670379	0 000000	949117	290489	000828	0 000000	978109	928340	998756
2	-3 340757	1 670379	1 063838	955082	284451	001044	- 039860	980556	936511	998748
3	-3 340757	1 670379	1 615641	956554	269726	001622	- 068676	985404	952447	998904
4	-3 340757	1 670379	1 901857	972376	252602	002392	- 080953	988565	961257	999704
5	-3 340757	1 670379	2 050315	973926	235644	003165	- 083560	990725	964893	1 001251
6	-3 340757	1 670379	2 127319	975217	219621	003824	- 083419	993309	968692	1 003330
7	-3 340757	1 670379	2 167260	974331	204905	004325	- 080463	995523	969968	1 005932
8	-3 340757	1 670379	2 187977	973022	189012	004648	- 075759	998120	971193	1 009099
9	-3 340757	1 670379	2 198723	970463	168751	004753	- 068343	1 000805	971243	1 012879
10	-3 340757	1 670379	2 204297	968002	140637	004524	- 057318	1 003900	971777	1 017044
11	-3 340757	1 670379	2 207188	965197	103889	003822	- 042470	1 006523	971493	1 020886
12	-3 340757	1 670379	2 208688	963816	064110	002683	- 026254	1 008356	971869	1 023332

13	-3 340757	1 670379	2 209465	962863	032150	001487	- 013176	1 008992	971521	1 024382
14	-3 340757	1 670379	2 209869	963032	012795	000625	- 005246	1 009185	971877	1 024506
15	-3 340757	1 670379	2 210078	962651	0 000000	0 000000	0 000000	1 009217	971524	1 024701

J= 5 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	3 246102	0 000000	947641	284959	001108	0 000000	978719	927474	1 000001
2	-3 340757	3 246102	1 063838	953456	279052	001426	- 039459	981098	935433	999982
3	-3 340757	3 246102	1 615641	964516	264671	002349	- 067740	985768	950789	1 000117
4	-3 340757	3 246102	1 901857	969948	247949	003720	- 079547	988745	959031	1 000887
5	-3 340757	3 246102	2 050315	971390	231330	005220	- 082006	990810	962463	1 002381
6	-3 340757	3 246102	2 127319	972711	215630	006541	- 081896	993329	966222	1 004384
7	-3 340757	3 246102	2 167260	971666	201276	007558	- 079025	995454	967448	1 006882
8	-3 340757	3 246102	2 187977	970660	185814	008224	- 074476	997953	968673	1 009911
9	-3 340757	3 246102	2 198723	968211	166092	008471	- 067266	1 000508	968702	1 013520
10	-3 340757	3 246102	2 204297	965897	138631	008102	- 056503	1 003470	969249	1 017495
11	-3 340757	3 246102	2 207188	963199	102601	006894	- 041945	1 005969	968949	1 021170
12	-3 340757	3 246102	2 208688	961900	063464	004905	- 025991	1 007736	969341	1 023516
13	-3 340757	3 246102	2 209465	960959	031906	002778	- 013076	1 008345	968978	1 024536
14	-3 340757	3 246102	2 209869	961146	012721	001188	- 005216	1 008535	969349	1 024649
15	-3 340757	3 246102	2 210078	960751	0 000000	0 000000	0 000000	1 008566	968981	1 024849

J= 5 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	3 559626	0 000000	946056	273390	000764	0 000000	980268	927388	1 002254
2	-3 340757	3 559626	1 063838	951862	267640	000978	- 039475	982625	935323	1 002209
3	-3 340757	3 559626	1 615641	962719	253732	001755	- 067266	987170	950368	1 002287
4	-3 340757	3 559626	1 901857	967650	237746	003210	- 078048	989882	957859	1 002988
5	-3 340757	3 559626	2 050315	968628	221940	005090	- 079538	991658	960548	1 004383
6	-3 340757	3 559626	2 127319	969817	207005	006921	- 079001	993986	963985	1 006247
7	-3 340757	3 559626	2 167260	969021	193433	008431	- 076102	995941	965088	1 008557
8	-3 340757	3 559626	2 187977	967954	178830	009477	- 071744	998256	966266	1 011346
9	-3 340757	3 559626	2 198723	965702	160105	009951	- 064872	1 000592	966273	1 014658
10	-3 340757	3 559626	2 204297	963617	133843	009617	- 054567	1 003318	966814	1 018302
11	-3 340757	3 559626	2 207188	961127	099213	008254	- 040568	1 005600	966510	1 021675
12	-3 340757	3 559626	2 208688	959961	061472	005972	- 025179	1 007231	966903	1 023830
13	-3 340757	3 559626	2 209465	959067	030958	003501	- 012689	1 007790	966538	1 024780
14	-3 340757	3 559626	2 209869	959268	012359	001558	- 005068	1 007968	966911	1 024874
15	-3 340757	3 559626	2 210078	958873	0 000000	0 000000	0 000000	1 007997	966541	1 025073

J= 5 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	3 662229	0 000000	943929	253821	000361	0 000000	982652	927553	1 005597
2	-3 340757	3 662229	1 063838	949847	248224	000425	- 040008	985024	935623	1 005507
3	-3 340757	3 662229	1 615641	960943	234802	000718	- 067707	989588	950938	1 005484
4	-3 340757	3 662229	1 901857	966017	219703	001408	- 077477	992244	958524	1 006062
5	-3 340757	3 662229	2 050315	966933	205163	002578	- 077387	993840	960976	1 007298
6	-3 340757	3 662229	2 127319	968022	191713	004150	- 075470	995923	964075	1 008954
7	-3 340757	3 662229	2 167260	967272	179681	005835	- 071853	997624	964974	1 010992
8	-3 340757	3 662229	2 187977	966383	166613	007198	- 067381	999675	966069	1 013442
9	-3 340757	3 662229	2 198723	964387	149495	007993	- 060796	1 001702	966028	1 016337
10	-3 340757	3 662229	2 204297	962622	125118	007925	- 051090	1 004091	966560	1 019508
11	-3 340757	3 662229	2 207188	960429	092800	006843	- 037967	1 006050	966240	1 022430
12	-3 340757	3 662229	2 208688	959467	057513	004896	- 023561	1 007474	966638	1 024288
13	-3 340757	3 662229	2 209465	958643	028944	002836	- 011864	1 007950	966264	1 025123
14	-3 340757	3 662229	2 209869	958872	011536	001253	- 004730	1 008107	966645	1 025186
15	-3 340757	3 662229	2 210078	958472	0 000000	0 000000	0 000000	1 008132	966266	1 025382

J= 5 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	3 695806	0 000000	940806	223007	000180	0 000000	985727	927378	1 010083
2	-3 340757	3 695806	1 063838	946673	217669	000221	- 040059	988038	935349	1 009935
3	-3 340757	3 695806	1 615641	957703	205006	000373	- 067432	992461	950483	1 009767
4	-3 340757	3 695806	1 901857	962893	191153	000650	- 076340	994984	958063	1 010148
5	-3 340757	3 695806	2 050315	964137	178376	001069	- 074989	996470	960733	1 011134
6	-3 340757	3 695806	2 127319	965508	167231	001704	- 071592	998372	963936	1 012488
7	-3 340757	3 695806	2 167260	964928	157844	002674	- 066635	999782	964717	1 014162
8	-3 340757	3 695806	2 187977	964276	147363	003858	- 061435	1 001511	965733	1 016190
9	-3 340757	3 695806	2 198723	962593	132752	004846	- 054767	1 003157	965632	1 018572

10	-3 340757	3 695806	2 204297	961227	111236	005267	- 045671	1 005120	966148	1 021145
11	-3 340757	3 695806	2 207188	959434	082609	004945	- 033839	1 006646	965810	1 023460
12	-3 340757	3 695806	2 208688	958750	051386	003807	- 021051	1 007786	966214	1 024911
13	-3 340757	3 695806	2 209465	958022	025940	002327	- 010631	1 008151	965831	1 025593
14	-3 340757	3 695806	2 209869	958083	010339	001068	- 004238	1 008282	966220	1 025616
15	-3 340757	3 695806	2 210078	957879	0 000000	0 000000	0 000000	1 008302	965832	1 025809

J= 5 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	3 706795	0 000000	937346	176430	000058	0 000000	989541	927542	1 015486
2	-3 340757	3 706795	1 063838	943294	171675	000075	- 037424	991852	935608	1 015285
3	-3 340757	3 706795	1 615641	954511	160600	000133	- 062583	996228	950911	1 014954
4	-3 340757	3 706795	1 901857	959866	149031	000215	- 069822	998563	958487	1 015059
5	-3 340757	3 706795	2 050315	961204	138955	000335	- 067473	99973	960950	1 015685
6	-3 340757	3 706795	2 127319	962787	130805	000524	- 063732	1 00134	964079	1 016646
7	-3 340757	3 706795	2 167260	962571	124789	000820	- 058565	1 002481	964960	1 017895
8	-3 340757	3 706795	2 187977	962233	117914	001237	- 052960	1 003879	965965	1 019458
9	-3 340757	3 706795	2 198723	960913	106915	001753	- 046163	1 005124	965837	1 021283
10	-3 340757	3 706795	2 204297	959993	089586	002368	- 037640	1 006607	966326	1 023186
11	-3 340757	3 706795	2 207188	958575	066572	002993	- 027432	1 007614	965974	1 024768
12	-3 340757	3 706795	2 208688	958333	041765	003136	- 017073	1 008386	966370	1 025700
13	-3 340757	3 706795	2 209465	957742	021293	002261	- 008719	1 008608	965987	1 026179
14	-3 340757	3 706795	2 209869	958032	008493	001044	- 003481	1 008707	966373	1 026155
15	-3 340757	3 706795	2 210078	957636	0 000000	0 000000	0 000000	1 008721	965988	1 026339

J= 5 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	3 710391	0 000000	933904	112722	000017	0 000000	993011	927378	1 020548
2	-3 340757	3 710391	1 063838	939763	109138	000025	- 028755	995303	935349	1 020347
3	-3 340757	3 710391	1 615641	950875	101008	000045	- 047757	999587	950462	1 019932
4	-3 340757	3 710391	1 901857	956403	093077	000060	- 052304	1 001735	958062	1 019756
5	-3 340757	3 710391	2 050315	958158	086603	000074	- 049950	1 002682	960728	1 019972
6	-3 340757	3 710391	2 127319	960056	081873	000107	- 047213	1 004032	963927	1 020537
7	-3 340757	3 710391	2 167260	960008	079222	000173	- 043212	1 004898	964710	1 021438
8	-3 340757	3 710391	2 187977	959929	075942	000274	- 038911	1 006045	965732	1 022637
9	-3 340757	3 710391	2 198723	958948	069331	000336	- 033477	1 006966	965628	1 023993
10	-3 340757	3 710391	2 204297	958455	057919	000306	- 026758	1 008008	966131	1 025263
11	-3 340757	3 710391	2 207188	957632	042791	000736	- 019030	1 008504	965775	1 026120
12	-3 340757	3 710391	2 208688	957645	026564	002049	- 011440	1 008901	966169	1 026518
13	-3 340757	3 710391	2 209465	957220	013339	002463	- 005586	1 008946	965783	1 026746
14	-3 340757	3 710391	2 209869	957552	005322	001079	- 002216	1 009000	966170	1 026659
15	-3 340757	3 710391	2 210078	957162	0 000000	0 000000	0 000000	1 009007	965783	1 026833

J= 5 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	3 711567	0 000000	932369	046688	000002	0 000000	994822	927541	1 023082
2	-3 340757	3 711567	1 063838	938266	044851	000005	- 014147	997167	935607	1 022910
3	-3 340757	3 711567	1 615641	949479	040809	000011	- 023412	1 001507	950910	1 022492
4	-3 340757	3 711567	1 901857	955107	037243	000010	- 024949	1 003539	958486	1 022147
5	-3 340757	3 711567	2 050315	956877	034412	000012	- 023629	1 004257	960951	1 022122
6	-3 340757	3 711567	2 127319	958866	032366	000017	- 022916	1 005439	964081	1 022475
7	-3 340757	3 711567	2 167260	959007	031708	000016	- 021175	1 006211	964963	1 023199
8	-3 340757	3 711567	2 187977	959026	030925	000018	- 018954	1 007236	965966	1 024234
9	-3 340757	3 711567	2 198723	958171	028230	000016	- 016056	1 007995	965831	1 025371
10	-3 340757	3 711567	2 204297	957885	022868	000017	- 013038	1 008812	966326	1 026325
11	-3 340757	3 711567	2 207188	957334	017077	000016	- 010284	1 009055	966003	1 026808
12	-3 340757	3 711567	2 208688	957581	011618	000017	- 006574	1 009233	966422	1 026884
13	-3 340757	3 711567	2 209465	957263	006018	000015	- 002871	1 009164	966036	1 026950
14	-3 340757	3 711567	2 209869	957619	002410	000016	- 000991	1 009196	966425	1 026830
15	-3 340757	3 711567	2 210078	957230	0 000000	0 000000	0 000000	1 009197	966034	1 026997

J= 5 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3 340757	3 711952	0 000000	931901	0 000000	0 000000	0 000000	995146	927377	1 023620
2	-3 340757	3 711952	1 063838	937695	0 000000	0 000000	0 000000	997497	935348	1 023498
3	-3 340757	3 711952	1 615641	948736	0 000000	0 000000	0 000000	1 001840	950482	1 023153
4	-3 340757	3 711952	1 901857	954393	0 000000	0 000000	0 000000	1 003845	958062	1 022764
5	-3 340757	3 711952	2 050315	956398	0 000000	0 000000	0 000000	1 004530	960730	1 022604
6	-3 340757	3 711952	2 127319	958493	0 000000	0 000000	0 000000	1 005675	963932	1 022874

7	-3 340757	3 711952	2 167260	958577	0 000000	0 000000	0 000000	1 006410	964721	1 023586
8	-3 340757	3 711952	2 187977	958645	0 000000	0 000000	0 000000	1 007412	965750	1 024576
9	-3 340757	3 711952	2 198723	957856	0 000000	0 000000	0 000000	1 008134	965648	1 025648
10	-3 340757	3 711952	2 204297	957605	0 000000	0 000000	0 000000	1 008905	966132	1 026539
11	-3 340757	3 711952	2 207188	957021	0 000000	0 000000	0 000000	1 009120	965748	1 027009
12	-3 340757	3 711952	2 208688	957254	0 000000	0 000000	0 000000	1 009269	966127	1 027061
13	-3 340757	3 711952	2 209465	956976	0 000000	0 000000	0 000000	1 009171	965752	1 027080
14	-3 340757	3 711952	2 209869	957341	0 000000	0 000000	0 000000	1 009181	966131	1 026934
15	-3 340757	3 711952	2 210078	957286	0 000000	0 000000	0 000000	1 009189	966082	1 026966

J= 6 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2 412769	0 000000	0 000000	930860	343495	0 000000	0 000000	972338	905111	1 000607
2	-2 412769	0 000000	880355	937846	338003	0 000000	- 056414	974948	914352	1 000297
3	-2 412769	0 000000	1 336987	949794	325248	0 000000	- 095353	979551	930372	999943
4	-2 412769	0 000000	1 573839	952487	311299	0 000000	- 110020	981336	934710	1 000631
5	-2 412769	0 000000	1 696691	950511	296889	0 000000	- 112226	982269	933657	1 002415
6	-2 412769	0 000000	1 760414	949542	282410	0 000000	- 111400	984255	934591	1 004852
7	-2 412769	0 000000	1 793467	946978	268780	0 000000	- 107906	986119	933834	1 007844
8	-2 412769	0 000000	1 810611	944973	253642	0 000000	- 103009	988844	934432	1 011487
9	-2 412769	0 000000	1 819503	941466	232785	0 000000	- 095032	991851	933794	1 016072
10	-2 412769	0 000000	1 824116	938288	200427	0 000000	- 082109	995885	934427	1 021585
11	-2 412769	0 000000	1 826508	934165	153245	0 000000	- 062871	999629	933818	1 027234
12	-2 412769	0 000000	1 827749	932099	098025	0 000000	- 040256	1 002529	934456	1 031127
13	-2 412769	0 000000	1 828393	930443	051247	0 000000	- 021052	1 003654	933842	1 033019
14	-2 412769	0 000000	1 828727	930722	021211	0 000000	- 008716	1 004029	934472	1 033280
15	-2 412769	0 000000	1 828900	930037	0 000000	0 000000	0 000000	1 004101	933851	1 033659

J= 6 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2 412769	1 670379	0 000000	930035	342097	001441	0 000000	972427	904391	1 001054
2	-2 412769	1 670379	880255	936966	336636	001685	- 056166	975015	913556	1 000742
3	-2 412769	1 670379	1 336987	948815	323944	002332	- 094909	979577	929437	1 000382
4	-2 412769	1 670379	1 573839	951503	310047	003193	- 109516	981348	933755	1 001058
5	-2 412769	1 670379	1 696691	949589	295687	004072	- 111755	982283	932765	1 002818
6	-2 412769	1 670379	1 760414	948645	281285	004833	- 110947	984249	933703	1 005226
7	-2 412769	1 670379	1 793467	946117	267744	005409	- 107487	986089	932956	1 008180
8	-2 412769	1 670379	1 810611	944147	252721	005753	- 102634	988779	933553	1 011774
9	-2 412769	1 670379	1 819503	940686	232006	005785	- 094713	991744	932920	1 016299
10	-2 412769	1 670379	1 824116	937554	199819	005350	- 081859	995730	933550	1 021747
11	-2 412769	1 670379	1 826508	933473	152827	004315	- 062699	999434	932945	1 027338
12	-2 412769	1 670379	1 827749	931429	097787	002849	- 040158	1 002309	933579	1 031197
13	-2 412769	1 670379	1 828393	929784	051136	001499	- 021006	1 003426	932969	1 033077
14	-2 412769	1 670379	1 828727	930062	021168	000617	- 008698	1 003798	933595	1 033336
15	-2 412769	1 670379	1 828900	929381	0 000000	0 000000	0 000000	1 003870	932978	1 033713

J= 6 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2 412769	3 246102	0 000000	928116	337123	001960	0 000000	972987	903045	1 002458
2	-2 412769	3 246102	880355	934913	331764	002322	- 055678	975513	912020	1 002132
3	-2 412769	3 246102	1 336987	946431	319318	003348	- 093865	979922	927429	1 001743
4	-2 412769	3 246102	1 573839	948903	305673	004828	- 108068	981563	931408	1 002373
5	-2 412769	3 246102	1 696691	947038	291518	006417	- 110221	982445	930413	1 004064
6	-2 412769	3 246102	1 760414	946182	277363	007820	- 109434	984355	931380	1 006380
7	-2 412769	3 246102	1 793467	943740	264124	008901	- 106049	986112	930633	1 009218
8	-2 412769	3 246102	1 810611	941889	249469	009560	- 101327	988701	931247	1 012664
9	-2 412769	3 246102	1 819503	938553	229201	009657	- 093576	991533	930606	1 017006
10	-2 412769	3 246102	1 824116	935571	197558	008927	- 080939	995379	931247	1 022251
11	-2 412769	3 246102	1 826508	931611	151196	007178	- 062033	998950	930632	1 027661
12	-2 412769	3 246102	1 827749	929653	096793	004729	- 039751	1 001746	931276	1 031405
13	-2 412769	3 246102	1 828393	928029	050632	002495	- 020799	1 002831	930656	1 033244
14	-2 412769	3 246102	1 828727	928325	020963	001030	- 008614	1 003196	931292	1 033489
15	-2 412769	3 246102	1 828900	927635	0 000000	0 000000	0 000000	1 003266	930665	1 033869

J= 6 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2 412769	3 564247	0 000000	926342	326910	001380	0 000000	974635	902845	1 004925
2	-2 412769	3 564247	880355	933142	321706	001632	- 055590	977137	911807	1 004561
3	-2 412769	3 564247	1 336987	944522	309689	002488	- 093234	981428	926980	1 004092

4	-2 412769	3 564247	1 573839	946721	296622	003948	- 106513	982866	930500	1 004629
5	-2 412769	3 564247	1 696691	944757	283033	005675	- 107938	983585	929249	1 006199
6	-2 412769	3 564247	1 760414	944013	269444	007282	- 106839	985387	930218	1 008360
7	-2 412769	3 564247	1 793467	941700	256850	008609	- 103394	986998	929456	1 011001
8	-2 412769	3 564247	1 810611	940038	242915	009475	- 098802	989421	930094	1 014199
9	-2 412769	3 564247	1 819503	936904	223481	009680	- 091305	992033	929440	1 018235
10	-2 412769	3 564247	1 824116	934172	192869	008894	- 079048	995640	930099	1 023132
11	-2 412769	3 564247	1 826508	930419	147777	006976	- 060642	998977	929467	1 028216
12	-2 412769	3 564247	1 827749	928611	094694	004390	- 038893	1 001634	930128	1 031752
13	-2 412769	3 564247	1 828393	927024	049555	002199	- 020358	1 002660	929490	1 033516
14	-2 412769	3 564247	1 828727	927351	020515	000871	- 008430	1 003011	930143	1 033732
15	-2 412769	3 564247	1 828900	926647	0 000000	0 000000	0 000000	1 003078	929499	1 034115

J= 6 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2 412769	3 665190	0 000000	924224	309871	000634	0 000000	977242	903191	1 008535
2	-2 412769	3 665190	880355	931149	304871	000723	- 055923	979751	912295	1 008110
3	-2 412769	3 665190	1 336987	942796	293439	001078	- 093311	984043	927752	1 007505
4	-2 412769	3 665190	1 573839	945245	281279	001756	- 105578	985434	931476	1 007882
5	-2 412769	3 665190	1 696691	943491	268778	002677	- 105722	986048	930327	1 009260
6	-2 412769	3 665190	1 760414	942977	256361	003723	- 103658	987720	931397	1 011192
7	-2 412769	3 665190	1 793467	940907	244996	004787	- 099717	989151	930699	1 013548
8	-2 412769	3 665190	1 810611	939510	232316	005606	- 095031	991351	931384	1 016405
9	-2 412769	3 665190	1 819503	936671	214262	005913	- 087767	993668	930740	1 020015
10	-2 412769	3 665190	1 824116	934282	185434	005361	- 076080	996934	931417	1 024413
11	-2 412769	3 665190	1 826508	930840	142668	003869	- 058566	999936	930780	1 029017
12	-2 412769	3 665190	1 827749	929225	091917	001945	- 037756	1 002396	931451	1 032264
13	-2 412769	3 665190	1 828393	927693	048329	000611	- 019854	1 003356	930806	1 033935
14	-2 412769	3 665190	1 828727	928041	020062	000108	- 008243	1 003692	931467	1 034126
15	-2 412769	3 665190	1 828900	927331	0 000000	0 000000	0 000000	1 003757	930815	1 034509

J= 6 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2 412769	3 697218	0 000000	920596	281162	000305	0 000000	980761	902884	1 013761
2	-2 412769	3 697218	880355	927463	276524	000360	- 055253	983203	911885	1 013769
3	-2 412769	3 697218	1 336987	939037	266111	000544	- 091699	987334	927143	1 012491
4	-2 412769	3 697218	1 573839	941595	255480	000819	- 102684	988534	930798	1 012618
5	-2 412769	3 697218	1 696691	940138	244835	001139	- 101519	988950	929750	1 013673
6	-2 412769	3 697218	1 760414	939965	234459	001494	- 098409	990402	930943	1 015236
7	-2 412769	3 697218	1 793467	938240	225182	001909	- 093788	991570	930331	1 017180
8	-2 412769	3 697218	1 810611	937188	214490	002308	- 088850	993476	931074	1 019593
9	-2 412769	3 697218	1 819503	934737	198596	002541	- 081781	995422	930458	1 022660
10	-2 412769	3 697218	1 824116	932803	172848	002444	- 070994	998227	931150	1 026392
11	-2 412769	3 697218	1 826508	929824	134494	001911	- 055175	1 000747	930519	1 030301
12	-2 412769	3 697218	1 827749	928483	088119	000971	- 036173	1 002919	931194	1 033133
13	-2 412769	3 697218	1 828393	927025	046931	000204	- 019275	1 003801	930548	1 034692
14	-2 412769	3 697218	1 828727	927387	019589	- 000031	- 008048	1 004124	931211	1 034863
15	-2 412769	3 697218	1 828900	926679	0 000000	0 000000	0 000000	1 004186	930558	1 035243

J= 6 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2 412769	3 707381	0 000000	916171	232306	000090	0 000000	985816	903176	1 020951
2	-2 412769	3 707381	880355	923089	228398	000113	- 050523	988288	912278	1 020437
3	-2 412769	3 707381	1 336987	934820	219920	000181	- 083167	992408	927722	1 019528
4	-2 412769	3 707381	1 573839	937631	211928	000245	- 091563	993400	931442	1 019322
5	-2 412769	3 707381	1 696691	936454	204180	000304	- 089092	993439	930309	1 019874
6	-2 412769	3 707381	1 760414	936598	196722	000380	- 085688	994483	931430	1 020883
7	-2 412769	3 707381	1 793467	935245	190285	000481	- 081249	995255	930807	1 022267
8	-2 412769	3 707381	1 810611	934575	182246	000522	- 076673	996783	931568	1 024129
9	-2 412769	3 707381	1 819503	932553	169252	000402	- 070300	998306	930973	1 026583
10	-2 412769	3 707381	1 824116	931145	148186	000465	- 061028	1 000572	931678	1 029536
11	-2 412769	3 707381	1 826508	928789	117569	001055	- 048035	1 002435	931050	1 032498
12	-2 412769	3 707381	1 827749	927905	079735	001518	- 032554	1 004118	931726	1 034626
13	-2 412769	3 707381	1 828393	926600	043662	000997	- 017891	1 004937	931082	1 035950
14	-2 412769	3 707381	1 828727	926991	018387	000355	- 007555	1 005129	931746	1 036076
15	-2 412769	3 707381	1 828900	926289	0 000000	0 000000	0 000000	1 005186	931093	1 036449

J= 6 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT

1	-2.412769	3.710605	0.000000	910915	155410	000024	0.000000	991184	902885	1.028876
2	-2.412769	3.710605	880355	917659	152757	000033	- 037353	993709	911886	1.028459
3	-2.412769	3.710605	1.336987	929148	147345	000054	- 060740	997842	927143	1.027609
4	-2.412769	3.710605	1.573839	932095	142988	000058	- 064997	998610	930800	1.027098
5	-2.412769	3.710605	1.696691	931363	138779	000054	- 062171	998271	929753	1.027073
6	-2.412769	3.710605	1.760414	931961	134640	000058	- 059883	998914	930949	1.027470
7	-2.412769	3.710605	1.793467	930993	131315	000070	- 056749	999296	930338	1.028290
8	-2.412769	3.710605	1.810611	930673	126229	000072	- 053508	1.000444	931087	1.029613
9	-2.412769	3.710605	1.819503	929045	116662	- 000080	- 048992	1.001564	930498	1.031487
10	-2.412769	3.710605	1.824116	928166	101972	- 000540	- 042919	1.003293	931222	1.033659
11	-2.412769	3.710605	1.826508	926495	082647	- 000250	- 034603	1.004432	930601	1.035579
12	-2.412769	3.710605	1.827749	926234	057667	001833	- 023967	1.005444	931276	1.036740
13	-2.412769	3.710605	1.828393	925285	032073	002697	- 013219	1.005793	930636	1.037514
14	-2.412769	3.710605	1.828727	925781	013799	001089	- 005728	1.005957	931295	1.037471
15	-2.412769	3.710605	1.828900	925105	0.000000	0.000000	0.000000	1.005991	930648	1.037810

J= 6 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2.412769	3.711628	0.000000	908286	066589	000003	0.000000	994373	903175	1.033381
2	-2.412769	3.711628	880355	915004	065415	000006	- 017260	997019	912276	1.033081
3	-2.412769	3.711628	1.336987	926507	063238	000009	- 027679	1.001311	927721	1.032356
4	-2.412769	3.711628	1.573839	929597	062018	000002	- 028204	1.001984	931442	1.031675
5	-2.412769	3.711628	1.696691	929016	060652	- 000002	- 026336	1.001394	930311	1.031326
6	-2.412769	3.711628	1.760414	929762	059086	- 000001	- 025719	1.001799	931435	1.031412
7	-2.412769	3.711628	1.793467	9289[illegible]	058025	- 000004	- 024502	1.001982	930815	1.031950
8	-2.412769	3.711628	1.810611	928876	055902	- 000003	- 023129	1.002906	931575	1.032945
9	-2.412769	3.711628	1.819503	927409	050541	- 000005	- 020759	1.003740	930968	1.034418
10	-2.412769	3.711628	1.824116	926897	041721	- 000004	- 018370	1.005156	931676	1.036145
11	-2.412769	3.711628	1.826508	925635	035258	- 000006	- 017429	1.005895	931092	1.037473
12	-2.412769	3.711628	1.827749	925910	029363	- 000005	- 014016	1.006377	931814	1.037846
13	-2.412769	3.711628	1.828393	925289	017466	- 000007	- 007587	1.006350	931164	1.038097
14	-2.412769	3.711628	1.828727	925887	007798	- 000007	- 003205	1.006428	931839	1.037909
15	-2.412769	3.711628	1.828900	925216	0.000000	0.000000	0.000000	1.006439	931173	1.038223

J= 6 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2.412769	3.711952	0.000000	907418	0.000000	0.000000	0.000000	995002	902883	1.034430
2	-2.412769	3.711952	880355	914013	0.000000	0.000000	0.000000	997671	911885	1.034204
3	-2.412769	3.711952	1.336987	925301	0.000000	0.000000	0.000000	1.001991	927143	1.033595
4	-2.412769	3.711952	1.573839	928350	0.000000	0.000000	0.000000	1.002639	930801	1.032904
5	-2.412769	3.711952	1.696691	927896	0.000000	0.000000	0.000000	1.002005	929756	1.032452
6	-2.412769	3.711952	1.760414	928753	0.000000	0.000000	0.000000	1.002370	930955	1.032448
7	-2.412769	3.711952	1.793467	928010	0.000000	0.000000	0.000000	1.002522	930351	1.032935
8	-2.412769	3.711952	1.810611	927953	0.000000	0.000000	0.000000	1.003400	931108	1.033865
9	-2.412769	3.711952	1.819503	926681	0.000000	0.000000	0.000000	1.004144	930521	1.035199
10	-2.412769	3.711952	1.824116	926181	0.000000	0.000000	0.000000	1.005442	931222	1.036761
11	-2.412769	3.711952	1.826508	924912	0.000000	0.000000	0.000000	1.006111	930564	1.038020
12	-2.412769	3.711952	1.827749	925173	0.000000	0.000000	0.000000	1.006543	931227	1.038349
13	-2.412769	3.711952	1.828393	924676	0.000000	0.000000	0.000000	1.006417	930610	1.038442
14	-2.412769	3.711952	1.828727	925296	0.000000	0.000000	0.000000	1.006417	931234	1.038163
15	-2.412769	3.711952	1.828900	925256	0.000000	0.000000	0.000000	1.006428	931204	1.038193

J= 7 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	0.000000	0.000000	901530	407805	0.000000	0.000000	961797	867089	1.002516
2	-1.855976	0.000000	770265	908844	403041	0.000000	- 068701	964182	876291	1.001759
3	-1.855976	0.000000	1.169795	920501	392081	0.000000	- 114675	967984	891030	1.000595
4	-1.855976	0.000000	1.377027	921959	379760	0.000000	- 131772	968803	893197	1.000808
5	-1.855976	0.000000	1.484517	920551	365697	0.000000	- 136394	969806	892756	1.002457
6	-1.855976	0.000000	1.540271	920497	351468	0.000000	- 137482	972177	894886	1.004932
7	-1.855976	0.000000	1.569191	918255	338331	0.000000	- 135201	974252	894612	1.008059
8	-1.855976	0.000000	1.584191	916568	323663	0.000000	- 131130	977337	895796	1.011995
9	-1.855976	0.000000	1.591971	912606	301664	0.000000	- 123002	980888	895165	1.017434
10	-1.855976	0.000000	1.596007	908523	263517	0.000000	- 107883	986306	896082	1.024890
11	-1.855976	0.000000	1.598100	902530	202775	0.000000	- 083156	992011	895319	1.033551
12	-1.855976	0.000000	1.599186	899155	128996	0.000000	- 052953	996670	896162	1.039963
13	-1.855976	0.000000	1.599745	896626	066828	0.000000	- 027442	998589	895361	1.043139
14	-1.855976	0.000000	1.600041	896897	027548	0.000000	- 011315	999205	896183	1.043656

15	-1.855976	0.000000	1.600193	895977	0 000000	0.000000	0 000000	.999326	.895373	1.044211

J= 7 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	1.670379	0.000000	900589	406583	.001940	0.000000	.961847	.866228	1.002987
2	-1.855976	1.670379	.770265	907868	401830	.002179	- 068477	.964220	.875384	1.002229
3	-1.855976	1.670379	1.169795	919474	390890	.002811	- .114291	.968001	.890052	1.001060
4	-1.855976	1.670379	1.377027	920960	378585	.003663	- .131344	.968818	.892243	1.001258
5	-1.855976	1.670379	1.484517	919604	364557	.004554	- .135975	.969818	.891848	1.002882
6	-1.855976	1.670379	1.540271	919570	350391	.005341	- .137064	.972165	.893974	1.005325
7	-1.855976	1.670379	1.569191	917365	337330	.005938	- .134807	.974215	.893711	1.008412
8	-1.855976	1.670379	1.584191	915707	322758	.006268	- .130766	.977264	.894888	1.012300
9	-1.855976	1.670379	1.591971	911794	300870	.006212	- .122680	.980775	.894265	1.017679
10	-1.855976	1.670379	1.596007	907753	262057	.005590	- .107614	.986143	.895174	1.025069
11	-1.855976	1.670379	1.598100	901809	202283	.004308	- .082954	.991806	.894420	1.033667
12	-1.855976	1.670379	1.599186	898457	128694	.002691	- .052829	.996434	.895254	1.040039
13	-1.855976	1.670379	1.599749	895947	066681	.001366	- .027381	.998343	.894462	1.043198
14	-1.855976	1.670379	1.600041	896212	027490	.000557	- .011292	.998955	.895276	1.043714
15	-1.855976	1.670379	1.600193	895301	0 000000	0 000000	0 000000	.999075	.894473	1.044264

J= 7 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	3.246102	0.000000	898433	402299	.002650	0.000000	.962325	.864585	1.004448
2	-1.855976	3.246102	.770265	905624	397602	.002999	- .068038	.964657	.873616	1.003676
3	-1.855976	3.246102	1.169795	917035	386789	.003971	- .113401	.968340	.888002	1.002474
4	-1.855976	3.246102	1.377027	918443	374615	.005354	- .130147	.969075	.890040	1.002620
5	-1.855976	3.246102	1.484517	917149	360732	.006844	- .134675	.970025	.889658	1.004170
6	-1.855976	3.246102	1.540271	917169	346771	.008177	- .135726	.972304	.891767	1.006520
7	-1.855976	3.246102	1.569191	915050	333062	.009203	- .133507	.974272	.891507	1.009491
8	-1.855976	3.246102	1.584191	913490	319694	.009774	- .129552	.977218	.892678	1.013234
9	-1.855976	3.246102	1.591971	909705	298164	.009681	- .121593	.980604	.892060	1.018435
10	-1.855976	3.246102	1.596007	905801	260588	.008627	- .106694	.985828	.892964	1.025624
11	-1.855976	3.246102	1.598100	899995	200569	.006529	- .082256	.991354	.892214	1.034029
12	-1.855976	3.246102	1.599186	896729	127614	.003991	- .052388	.995890	.893044	1.040272
13	-1.855976	3.246102	1.599749	894258	066132	.002000	- .027156	.997762	.892256	1.043378
14	-1.855976	3.246102	1.600041	894529	027269	.000812	- .011201	.998363	.893065	1.043881
15	-1.855976	3.246102	1.600193	893624	0 000000	0.000000	0.000000	.998482	.892268	1.044427

J= 7 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	3.567415	0.000000	896636	393604	.001857	0.000000	.963983	.864342	1.006985
2	-1.855976	3.567415	.770265	903859	389034	.002097	- .067952	.966298	.873397	1.006169
3	-1.855976	3.567415	1.169795	915251	378542	.002871	- .112891	.969901	.887703	1.004874
4	-1.855976	3.567415	1.377027	916592	366771	.004112	- .128943	.970505	.889558	1.004910
5	-1.855976	3.567415	1.484517	915321	353304	.005522	- .132893	.971338	.889087	1.006332
6	-1.855976	3.567415	1.540271	915422	339812	.006830	- .133602	.973504	.891167	1.008530
7	-1.855976	3.567415	1.569191	913412	327532	.007889	- .131260	.975331	.890880	1.011312
8	-1.855976	3.567415	1.584191	912015	313860	.008492	- .127358	.978116	.892057	1.014821
9	-1.855976	3.567415	1.591971	908419	293038	.008377	- .119583	.981291	.891424	1.019726
10	-1.855976	3.567415	1.596007	904752	256390	.007210	- .105011	.986279	.892339	1.026569
11	-1.855976	3.567415	1.598100	899154	197555	.005031	- .081033	.991573	.891577	1.034645
12	-1.855976	3.567415	1.599186	896029	125821	.002671	- .051655	.995970	.892417	1.040681
13	-1.855976	3.567415	1.599749	893597	065242	.001142	- .026792	.997786	.891618	1.043712
14	-1.855976	3.567415	1.600041	893893	026909	.000415	- .011053	.998374	.892439	1.044188
15	-1.855976	3.567415	1.600193	892979	0 000000	0.000000	0.000000	.998489	.891630	1.044736

J= 7 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	3.667169	0.000000	894588	378767	.000813	0.000000	.966733	.864827	1.010781
2	-1.855976	3.667169	.770265	901929	374421	.000910	- .068107	.969045	.874010	1.009893
3	-1.855976	3.667169	1.169795	913577	364526	.001261	- .112732	.972625	.888567	1.008434
4	-1.855976	3.667169	1.377027	915198	353574	.001826	- .127915	.973164	.890638	1.008277
5	-1.855976	3.667169	1.484517	914178	340998	.002467	- .130856	.973893	.890312	1.009483
6	-1.855976	3.667169	1.540271	914486	328438	.003104	- .130783	.975919	.892464	1.011446
7	-1.855976	3.667169	1.569191	912670	317120	.003702	- .128005	.977559	.892188	1.013952
8	-1.855976	3.667169	1.584191	911501	304459	.004057	- .123997	.980125	.893385	1.017136
9	-1.855976	3.667169	1.591971	908180	284916	.003909	- .116452	.983004	.892745	1.021614
10	-1.855976	3.667169	1.596007	904859	250179	.002998	- .102523	.987638	.893673	1.027934
11	-1.855976	3.667169	1.598100	899561	193843	.001456	- .079521	.992597	.892901	1.035525

12	-1.855976	3.667169	1.599186	896589	.124222	.000082	-.051000	.996837	.893753	1.041326
13	-1.855976	3.667169	1.599749	894179	.064662	-.000364	-.026553	.998618	.892943	1.044310
14	-1.855976	3.667169	1.600041	894490	.026710	-.000246	-.010971	.999200	.893775	1.044774
15	-1.855976	3.667169	1.600193	893567	0.000000	0.000000	0.000000	.999315	.892954	1.045326

J= 7 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	3.698138	0.000000	.890505	.351470	.000370	0.000000	.970707	.864419	1.016795
2	-1.855976	3.698138	.770265	897787	.347552	.000431	-.066709	.972959	.873510	1.015840
3	-1.855976	3.698138	1.169795	909364	.338804	.000619	-.109838	.976373	.887879	1.014194
4	-1.855976	3.698138	1.377027	911090	.329419	.000843	-.123464	.976678	.889841	1.013741
5	-1.855976	3.698138	1.484517	910334	.318507	.001035	-.125171	.977147	.889530	1.014565
6	-1.855976	3.698138	1.540271	910961	.307551	.001175	-.124370	.978910	.891748	1.016115
7	-1.855976	3.698138	1.569191	909463	.297733	.001259	-.121224	.980263	.891513	1.018189
8	-1.855976	3.698138	1.584191	908601	.286519	.001216	-.117178	.982521	.892720	1.020922
9	-1.855976	3.698138	1.591971	905677	.269042	.000978	-.110075	.984998	.892090	1.024817
10	-1.855976	3.698138	1.596007	902878	.238229	.000607	-.097548	.989075	.893014	1.030333
11	-1.855976	3.698138	1.598100	898118	.187734	.000200	-.076920	.993465	.892249	1.037097
12	-1.855976	3.698138	1.599186	895376	.122826	-.000184	-.050389	.997455	.893097	1.042537
13	-1.855976	3.698138	1.599749	892980	.064653	-.000282	-.026542	.999230	.892293	1.045511
14	-1.855976	3.698138	1.600041	893278	.026778	-.000149	-.010999	.999822	.893119	1.045991
15	-1.855976	3.698138	1.600193	892359	0.000000	0.000000	0.000000	.999939	.892304	1.046544

J= 7 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	3.707753	0.000000	.884807	.298213	.000087	0.000000	.977403	.864813	1.026442
2	-1.855976	3.707753	.770265	892084	.295124	.000113	-.059983	.979721	.873994	1.025511
3	-1.855976	3.707753	1.169795	903744	.288474	.000183	-.097876	.983177	.888540	1.023796
4	-1.855976	3.707753	1.377027	905763	.281735	.000225	-.108166	.983269	.890609	1.022978
5	-1.855976	3.707753	1.484517	905398	.273472	.000235	-.108375	.983314	.890290	1.023190
6	-1.855976	3.707753	1.540271	906422	.264925	.000239	-.107322	.984594	.892457	1.024059
7	-1.855976	3.707753	1.569191	905342	.257109	.000231	-.104496	.985484	.892200	1.025473
8	-1.855976	3.707753	1.584191	904886	.247502	.000088	-.100984	.987318	.893410	1.027589
9	-1.855976	3.707753	1.591971	902429	.232362	-.000330	-.094902	.989304	.892777	1.030777
10	-1.855976	3.707753	1.596007	900338	.207720	-.000457	-.084853	.992635	.893706	1.035207
11	-1.855976	3.707753	1.598100	896494	.169131	.000400	-.068903	.996027	.892932	1.040524
12	-1.855976	3.707753	1.599186	894382	.116089	.001343	-.047382	.999331	.893784	1.044961
13	-1.855976	3.707753	1.599749	892120	.062890	.001075	-.025764	1.000958	.892975	1.047724
14	-1.855976	3.707753	1.600041	892430	.026183	.000475	-.010755	1.001543	.893807	1.048189
15	-1.855976	3.707753	1.600193	891508	0.000000	0.000000	0.000000	1.001659	.892987	1.048745

J= 7 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	3.710738	0.000000	876966	.202883	.000020	0.000000	.985694	.864421	1.038841
2	-1.855976	3.710738	.770265	883974	.201076	.000029	-.042817	.988164	.873512	1.038134
3	-1.855976	3.710738	1.169795	895240	.197443	.000049	-.068798	.991779	.887880	1.036666
4	-1.855976	3.710738	1.377027	897337	.194065	.000046	-.073703	.991650	.889844	1.035562
5	-1.855976	3.710738	1.484517	897427	.189011	.000036	-.073074	.991205	.889534	1.035057
6	-1.855976	3.710738	1.540271	898997	.183466	.000033	-.072900	.991941	.891752	1.035101
7	-1.855976	3.710738	1.569191	898443	.178285	.000030	-.071143	.992285	.891511	1.035715
8	-1.855976	3.710738	1.584191	898474	.170646	.000005	-.068590	.993582	.892707	1.037054
9	-1.855976	3.710738	1.591971	896555	.157634	-.000244	-.064071	.995013	.892084	1.039437
10	-1.855976	3.710738	1.596007	895199	.140487	-.000933	-.058076	.997570	.893023	1.042739
11	-1.855976	3.710738	1.598100	892409	.119270	-.000422	-.049500	.999827	.892255	1.046403
12	-1.855976	3.710738	1.599186	891312	.085658	.002602	-.035448	1.002002	.893096	1.049196
13	-1.855976	3.710738	1.599749	889692	.046890	.003639	-.019308	1.002925	.892295	1.050927
14	-1.855976	3.710738	1.600041	890203	.019800	.001533	-.008188	1.003274	.893117	1.051051
15	-1.855976	3.710738	1.600193	889334	0.000000	0.000000	0.000000	1.003344	.892308	1.051535

J= 7 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	3.711665	0.000000	.872724	.086118	.000001	0.000000	.990933	.864811	1.046389
2	-1.855976	3.711665	.770265	879625	.085467	.000004	-.018716	.993597	.873992	1.045903
3	-1.855976	3.711665	1.169795	890781	.084295	.000007	-.029503	.997484	.888539	1.044714
4	-1.855976	3.711665	1.377027	893028	.083380	.000000	-.030026	.997291	.890609	1.043460
5	-1.855976	3.711665	1.484517	893366	.081215	.000000	-.029575	.996558	.890291	1.042535
6	-1.855976	3.711665	1.540271	895171	.078770	.000004	-.030137	.996973	.892462	1.042128
7	-1.855976	3.711665	1.569191	894902	.076638	.000001	-.029617	.996990	.892209	1.042271
8	-1.855976	3.711665	1.584191	895328	.072954	.000003	-.028493	.997867	.893419	1.042989

9	-1.855976	3.711665	1.591971	.893874	.064571	.000001	-.025604	.998758	.892764	1.044600
10	-1.855976	3.711665	1.596007	.892897	.052538	.000002	-.022915	1.000885	.893688	1.047282
11	-1.855976	3.711665	1.598100	.890647	.048489	-.000000	-.023942	1.002604	.892966	1.050140
12	-1.855976	3.711665	1.599186	.890500	.044238	.000002	-.020714	1.003792	.893877	1.051454
13	-1.855976	3.711665	1.599749	.889570	.025001	-.000001	-.010824	1.003920	.893057	1.052028
14	-1.855976	3.711665	1.600041	.890295	.010732	-.000000	-.004408	1.004054	.893904	1.051825
15	-1.855976	3.711665	1.600193	.889438	0.000000	0.000000	0.000000	1.004079	.893065	1.052256

J= 7 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.855976	3.711952	0.000000	.871424	0.000000	0.000000	0.000000	.991962	.864420	1.048102
2	-1.855976	3.711952	.770265	.878196	0.000000	0.000000	0.000000	.994666	.873511	1.047709
3	-1.855976	3.711952	1.160795	.889120	0.000000	0.000000	0.000000	.998605	.887880	1.046669
4	-1.855976	3.711952	1.377027	.891280	0.000000	0.000000	0.000000	.998390	.889845	1.045429
5	-1.855976	3.711952	1.484517	.891676	0.000000	0.000000	0.000000	.997599	.889536	1.044415
6	-1.855976	3.711952	1.540271	.893581	0.000000	0.000000	0.000000	.997959	.891757	1.043900
7	-1.855976	3.711952	1.569191	.893384	0.000000	0.000000	0.000000	.997918	.891524	1.043950
8	-1.855976	3.711952	1.584191	.893887	0.000000	0.000000	0.000000	.998706	.892730	1.044539
9	-1.855976	3.711952	1.591971	.892635	0.000000	0.000000	0.000000	.999414	.892..1	1.045865
10	-1.855976	3.711952	1.596007	.891851	0.000000	0.000000	0.000000	1.001318	.893027	1.048226
11	-1.855976	3.711952	1.598100	.889591	0.000000	0.000000	0.000000	1.002956	.892221	1.051007
12	-1.855976	3.711952	1.599186	.889417	0.000000	0.000000	0.000000	1.004097	.893061	1.052286
13	-1.855976	3.711952	1.599749	.888687	0.000000	0.000000	0.000000	1.004050	.892286	1.052582
14	-1.855976	3.711952	1.600041	.889443	0.000000	0.000000	0.000000	1.004060	.893054	1.052234
15	-1.855976	3.711952	1.600193	.889440	0.000000	0.000000	0.000000	1.004069	.893059	1.052245

J= 8 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.391982	0.000000	0.000000	.870840	.472545	0.000000	0.000000	.949398	.826773	1.003397
2	-1.391982	0.000000	.678523	.878709	.468146	0.000000	-.078406	.951718	.836284	1.002237
3	-1.391982	0.000000	1.030468	.891788	.457393	0.000000	-.131285	.955518	.852120	1.000308
4	-1.391982	0.000000	1.213018	.895051	.444200	0.000000	-.152661	.956627	.856231	1.000008
5	-1.391982	0.000000	1.307706	.895351	.429091	0.000000	-.160129	.958116	.857850	1.001431
6	-1.391982	0.000000	1.356819	.895638	.414916	0.000000	-.162283	.960521	.860278	1.003815
7	-1.391982	0.000000	1.382294	.893715	.402261	0.000000	-.160849	.962672	.860354	1.006929
8	-1.391982	0.000000	1.395508	.891964	.388222	0.000000	-.157290	.965854	.861507	1.011050
9	-1.391982	0.000000	1.402361	.887634	.365245	0.000000	-.148936	.970028	.861030	1.017397
10	-1.391982	0.000000	1.405916	.882094	.321562	0.000000	-.131629	.977049	.861850	1.027331
11	-1.391982	0.000000	1.407760	.873899	.247482	0.000000	-.101480	.985483	.861213	1.040075
12	-1.391982	0.000000	1.408717	.868538	.155894	0.000000	-.063985	.992409	.861944	1.049966
13	-1.391982	0.000000	1.409213	.865278	.080044	0.000000	-.032865	.995360	.861263	1.054673
14	-1.391982	0.000000	1.409470	.865216	.032924	0.000000	-.013522	.996249	.861971	1.055646
15	-1.391982	0.000000	1.409604	.864365	0.000000	0.000000	0.000000	.996428	.861277	1.056250

J= 8 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.391982	1.670379	0.000000	.869687	.471442	.002273	0.000000	.949430	.825897	1.003871
2	-1.391982	1.670379	.678523	.877726	.467050	.002496	-.078215	.951742	.835369	1.002710
3	-1.391982	1.670379	1.030468	.890763	.456312	.003088	-.130962	.955525	.851146	1.000777
4	-1.391982	1.670379	1.213018	.894042	.443137	.003895	-.152294	.956628	.855265	1.000461
5	-1.391982	1.670379	1.307706	.894375	.428062	.004753	-.159758	.958106	.856906	1.001857
6	-1.391982	1.670379	1.356819	.894681	.413939	.005521	-.161910	.960488	.859330	1.004210
7	-1.391982	1.670379	1.382294	.892791	.401349	.006102	-.160491	.962615	.859414	1.007285
8	-1.391982	1.670379	1.395508	.891069	.387385	.006399	-.156955	.965761	.860560	1.011359
9	-1.391982	1.670379	1.402361	.886784	.364494	.006261	-.148632	.969898	.860090	1.017651
10	-1.391982	1.670379	1.405916	.881286	.320911	.005500	-.131363	.976872	.860904	1.027522
11	-1.391982	1.670379	1.407760	.873142	.246977	.004078	-.101273	.985261	.860273	1.040201
12	-1.391982	1.670379	1.408717	.867808	.155577	.002442	-.063855	.992153	.860998	1.050047
13	-1.391982	1.670379	1.409213	.864568	.079888	.001213	-.032801	.995090	.860323	1.054734
14	-1.391982	1.670379	1.409470	.864503	.032662	.000492	-.013497	.995976	.861024	1.055704
15	-1.391982	1.670379	1.409604	.863659	0.000000	0.000000	0.000000	.996154	.860337	1.056305

J= 8 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.391982	3.246102	0.000000	.867739	.467664	.003078	0.000000	.949871	.824239	1.005331
2	-1.391982	3.246102	.678523	.875504	.463318	.003402	-.077849	.952148	.833610	1.004156
3	-1.391982	3.246102	1.030468	.888374	.452687	.004296	-.130225	.955847	.849149	1.002190
4	-1.391982	3.246102	1.213018	.891569	.439632	.005563	-.151290	.956868	.853113	1.001820
5	-1.391982	3.246102	1.307706	.891925	.424692	.006934	-.158633	.958282	.854716	1.003141

6	-1.391982	3.246102	1.356819	.892277	.410738	.008169	-.160740	.960593	.857114	1.005401
7	-1.391982	3.246102	1.382294	.890466	.398356	.009106	-.159344	.962641	.857199	1.008364
8	-1.391982	3.246102	1.395508	.888832	.384642	.009572	-.155872	.965690	.858336	1.012301
9	-1.391982	3.246102	1.402361	.884667	.362040	.009313	-.147647	.969711	.857872	1.018428
10	-1.391982	3.246102	1.405916	.879298	.318811	.008040	-.130512	.976550	.858679	1.028111
11	-1.391982	3.246102	1.407760	.871294	.245358	.005790	-.100613	.984805	.858054	1.040601
12	-1.391982	3.246102	1.408717	.866048	.154550	.003361	-.063435	.991600	.858773	1.050316
13	-1.391982	3.246102	1.409213	.862851	.079368	.001645	-.032588	.994498	.858104	1.054945
14	-1.391982	3.246102	1.409470	.862792	.032653	.000666	-.013411	.995373	.858799	1.055901
15	-1.391982	3.246102	1.409604	.861955	0.000000	0.000000	0.000000	.995548	.858118	1.056497

J= 8 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.391982	3.570353	0.000000	.866101	.460174	.002082	0.000000	.951527	.824119	1.007845
2	-1.391982	3.570353	.678523	.873893	.455950	.002312	-.077790	.953787	.833507	1.006626
3	-1.391982	3.570353	1.030468	.886747	.445614	.003024	-.129834	.957407	.848978	1.004561
4	-1.391982	3.570353	1.213018	.889386	.432916	.004116	-.150328	.958299	.852776	1.004077
5	-1.391982	3.570353	1.307706	.890241	.418339	.005334	-.157159	.959588	.854265	1.005268
6	-1.391982	3.570353	1.356819	.890656	.404770	.006447	-.158948	.961784	.856619	1.007380
7	-1.391982	3.570353	1.382294	.888953	.392813	.007304	-.157426	.963704	.856687	1.010164
8	-1.391982	3.570353	1.395508	.887460	.379605	.007699	-.153986	.966601	.857820	1.013883
9	-1.391982	3.570353	1.402361	.883477	.357657	.007339	-.145933	.970429	.857352	1.019731
10	-1.391982	3.570353	1.405916	.878318	.315327	.005952	-.129116	.977049	.858160	1.029095
11	-1.391982	3.570353	1.407760	.870503	.242964	.003754	-.099642	.985102	.857534	1.041293
12	-1.391982	3.570353	1.408717	.865368	.153179	.001752	-.062875	.991778	.858254	1.050834
13	-1.391982	3.570353	1.409213	.862212	.078705	.000685	-.032316	.994632	.857583	1.055399
14	-1.391982	3.570353	1.409470	.862164	.032386	.000240	-.013301	.995494	.858279	1.056337
15	-1.391982	3.570353	1.409604	.861329	0.000000	0.000000	0.000000	.995667	.857597	1.056931

J= 8 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.391982	3.668967	0.000000	.864192	.447256	.000878	0.000000	.954310	.824707	1.011685
2	-1.391982	3.668967	.678523	.872080	.443266	.000988	-.077796	.956559	.834196	1.010391
3	-1.391982	3.668967	1.030468	.885145	.433510	.001342	-.129498	.960137	.849860	1.008155
4	-1.391982	3.668967	1.213018	.888535	.421536	.001826	-.149237	.960950	.853838	1.007467
5	-1.391982	3.668967	1.307706	.889116	.407693	.002303	-.155220	.962127	.855442	1.008438
6	-1.391982	3.668967	1.356819	.889719	.394853	.002727	-.156352	.964184	.857853	1.010320
7	-1.391982	3.668967	1.382294	.888205	.383622	.003067	-.154461	.965934	.857947	1.012843
8	-1.391982	3.668967	1.395508	.886925	.371256	.003141	-.150945	.968624	.859097	1.016250
9	-1.391982	3.668967	1.402361	.883221	.350625	.002714	-.143195	.972160	.858633	1.021669
10	-1.391982	3.668967	1.405916	.878405	.310485	.001645	-.127167	.978418	.859447	1.030497
11	-1.391982	3.668967	1.407760	.870859	.240759	.000243	-.098742	.986175	.858819	1.042258
12	-1.391982	3.668967	1.408717	.865813	.152667	-.000627	-.062664	.992759	.859543	1.051657
13	-1.391982	3.668967	1.409213	.862659	.078673	-.000618	-.032302	.995609	.858871	1.056217
14	-1.391982	3.668967	1.409470	.862612	.032410	-.000316	-.013311	.996474	.859570	1.057158
15	-1.391982	3.668967	1.409604	.861773	0.000000	0.000000	0.000000	.996648	.858885	1.057754

J= 8 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.391982	3.698957	0.000000	.859706	.420876	.000403	0.000000	.958710	.824208	1.018468
2	-1.391982	3.698957	.678523	.867532	.417360	.000473	-.075792	.960912	.833622	1.017114
3	-1.391982	3.698957	1.030468	.880521	.408795	.000672	-.125626	.964346	.849127	1.014698
4	-1.391982	3.698957	1.213018	.884020	.398288	.000860	-.143724	.964929	.853016	1.013702
5	-1.391982	3.698957	1.307706	.884867	.385829	.000966	-.148599	.965842	.854642	1.014274
6	-1.391982	3.698957	1.356819	.885786	.374182	.000986	-.149164	.967634	.857117	1.015733
7	-1.391982	3.698957	1.382294	.884572	.363938	.000908	-.147011	.969108	.857246	1.017839
8	-1.391982	3.698957	1.395508	.883595	.352542	.000653	-.143509	.971501	.858413	1.020803
9	-1.391982	3.698957	1.402361	.880343	.333948	.000194	-.136355	.974573	.857958	1.025542
10	-1.391982	3.698957	1.405916	.876238	.298704	-.000255	-.122211	.980069	.858774	1.033256
11	-1.391982	3.698957	1.407760	.869412	.236339	-.000483	-.096823	.987046	.858150	1.043872
12	-1.391982	3.698957	1.408717	.864611	.153125	-.000511	-.062814	.993365	.858874	1.052884
13	-1.391982	3.698957	1.409213	.861443	.079638	-.000358	-.032691	.996239	.858203	1.057481
14	-1.391982	3.698957	1.409470	.861380	.032864	-.000159	-.013497	.997122	.858901	1.058451
15	-1.391982	3.698957	1.409604	.860540	0.000000	0.000000	0.000000	.997300	.858217	1.059053

J= 8 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.391982	3.708078	0.000000	.852514	.362331	.000083	0.000000	.967356	.824685	1.031112
2	-1.391982	3.708078	.678523	.860274	.359778	.000115	-.067414	.969660	.834173	1.029828

3	-1.391982	3.708078	1.030468	873243	.353521	000196	-.110939	.973184	849826	1.027403
4	-1.391982	3.708078	1.213018	876993	.345646	.000229	-.125249	.973556	853802	1.026036
5	-1.391982	3.708078	1.307706	878232	335552	.000215	-.128554	.974013	855410	1.025938
6	-1.391982	3.708078	1.356819	879567	.325807	000185	-.128883	.975285	857829	1.026654
7	-1.391982	3.708078	1.382294	878776	.316764	000136	-.126989	.976286	857937	1.028077
8	-1.391982	3.708078	1.395508	878212	.305835	- 000075	- 123807	.979239	859101	1.030399
9	-1.391982	3.708078	1 402361	875605	288573	-.000625	-.117465	980636	858650	1 034153
10	-1.391982	3.708078	1 405916	872818	260661	-.000801	- 106349	.984705	859469	1 039768
11	-1.391982	3.708078	1.407760	867833	.215277	.000320	-.087714	.989639	858841	1.047375
12	-1.391982	3.708078	1.408717	864097	.148228	.001509	- 060538	.994755	859565	1 054608
13	-1.391982	3.708078	1.409213	861086	079531	.001231	-.032590	.997456	858895	1.058949
14	-1.391982	3.708078	1.409470	861027	032971	000553	- 013540	.998335	859594	1.059911
15	-1.391982	3.708078	1.409604	860190	0 000000	0 000000	0.000000	.998512	858910	1 060512

J= 8 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.391982	3.710852	0.000000	841516	246957	000023	0 000000	979434	824209	1.049422
2	-1.391982	3.710852	678523	848916	245859	000035	- 046890	981986	833624	1.048478
3	-1.391982	3.710852	1 030468	861340	242939	000058	- 076313	985321	849127	1.046474
4	-1.391982	3.710852	1.213018	865126	238591	000055	- 084184	986005	853018	1.044834
5	-1.391982	3.710852	1.307706	866867	231732	000044	- 086135	985901	854645	1.043884
6	-1.391982	3.710852	1.356819	868834	224889	000038	- 086987	986517	857119	1.043589
7	-1.391982	3.710852	1.382294	868663	218094	000032	- 085799	986852	857242	1.044026
8	-1.391982	3.710852	1.395508	868747	208005	- 000001	- 082957	988083	858394	1.045288
9	-1.391982	3.710852	1.402361	867136	190968	- 000334	- 077352	989399	857943	1.047458
10	-1.391982	3.710852	1.405916	866135	171189	- 001214	- 070651	991502	858774	1.050169
11	-1.391982	3.710852	1.407760	863582	150906	- 000372	- 062554	993705	858146	1.053746
12	-1.391982	3.710852	1.408717	861726	112624	003515	- 046525	996678	858863	1 057808
13	-1.391982	3.710852	1.409213	859568	062034	004392	- 025530	998404	858197	1.060704
14	-1.391982	3.710852	1.409470	859769	026105	001795	- 010764	998978	858891	1.061215
15	-1.391982	3.710852	1.409604	858992	0 000000	0 000000	0 000000	999093	858212	1.061720

J= 8 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.391982	3.711696	0 000000	PJ5399	102916	000003	0 000000	987172	824683	1.060805
2	-1.391982	3.711696	678523	842600	102711	000007	- 019712	989997	834171	1 060194
3	-1.391982	3 711696	1.030468	854755	101956	000011	- 031712	994232	849825	1 058646
4	-1.391982	3 711696	1.213018	858637	100381	000006	- 033766	994368	853801	1.056874
5	-1.391982	3.711696	1.307706	860661	097261	000007	- 034668	993900	855411	1.055382
6	-1.391982	3.711696	1.356819	862929	094315	000009	- 035517	994096	857834	1 054480
7	-1.391982	3.711696	1.382294	863151	091457	000007	- 035184	993971	857948	1.054239
8	-1.391982	3.711696	1.395508	863861	086486	000008	- 033730	994503	859113	1.054456
9	-1.391982	3.711696	1.402361	863227	074734	000005	- 029695	994679	858635	1.054953
10	-1.391982	3.711696	1.405916	863236	059517	000006	- 026391	995610	859447	1 055935
11	-1.391982	3.711696	1.407760	861609	060640	000003	- 030123	996845	858891	1.058043
12	-1.391982	3 711696	1.408717	860986	060338	000005	- 027767	998492	859688	1.060099
13	-1 391982	3 711696	1.409213	859880	033055	000002	- 014206	998987	859009	1 061169
14	-1 391982	3 711696	1.409470	860463	013999	000002	- 005755	999141	859723	1 061045
15	-1 391982	3.711696	1 409604	859732	0 000000	0 000000	0 000000	999172	859019	1 061439

J= 8 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1 391982	3.711952	0.000000	833666	0 000000	0 000000	0.000000	.988655	824208	1 063280
2	-1.391982	3.711952	.678523	840739	0 000000	0 000000	0 000000	.991536	833623	1.062781
3	-1.391982	3.711952	1.030468	852666	0 000000	0 000000	0 000000	.995849	849127	1.061408
4	-1.391982	3.711952	1.213018	856473	0 000000	0 000000	0 000000	.995966	853017	1.059641
5	-1.391982	3.711952	1.307706	858576	0 000000	0 000000	0 000000	.995422	854646	1.058025
6	-1.391982	3 711952	1 356819	860960	0 000000	0 000000	0 000000	.995545	857124	1.056982
7	-1.391982	3.711952	1.382294	861269	0 000000	0 000000	0 000000	.995337	857254	1.056610
8	-1.391982	3 711952	1.395508	862108	0 000000	0 000000	0 000000	.995720	858419	1.056605
9	-1 391982	3 711952	1 402361	861794	0 000000	0 000000	0 000000	995571	857977	1 056601
10	-1 391982	3 711952	1.405916	862114	0 000000	0 000000	0 000000	996145	858790	1.057052
11	-1.391982	3 711952	1.407760	860467	0 000000	0 000000	0 000000	997282	858128	1.059069
12	-1 391982	3.711952	1.408717	859896	0 000000	0 000000	0 000000	998788	858854	1.060950
13	-1.391982	3.711952	1.409213	859069	0 000000	0 000000	0 000000	998993	858204	1.061576
14	-1.391982	3.711952	1.409470	859733	0 000000	0 000000	0 000000	999146	858999	1.061411
15	-1.391982	3.711952	1.409604	859732	0 000000	0 000000	0 000000	999159	859009	1.061425

J= 9 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	0.000000	0.000000	.842619	.528973	0.000000	0.000000	.937090	.789610	1.003527
2	-1.113586	0.000000	.623478	.849970	.526050	0.000000	-.085400	.939008	.798129	1.002093
3	-1.113586	0.000000	.946871	.862489	.517864	0.000000	-.144369	.942196	.812635	.999632
4	-1.113586	0.000000	1.114613	.866196	.505760	0.000000	-.170845	.943145	.816948	.998923
5	-1.113586	0.000000	1.201618	.867195	.490591	0.000000	-.181680	.944676	.819218	1.000083
6	-1.113586	0.000000	1.246748	.867530	.476553	0.000000	-.185443	.946913	.821475	1.002297
7	-1.113586	0.000000	1.270156	.866008	.464339	0.000000	-.185211	.949081	.821912	1.005298
8	-1.113586	0.000000	1.282298	.864162	.451144	0.000000	-.182469	.952230	.822881	1.009494
9	-1.113586	0.000000	1.288595	.859651	.428339	0.000000	-.174501	.956997	.822683	1.016674
10	-1.113586	0.000000	1.291862	.852501	.381723	0.000000	-.156164	.965729	.823285	1.029384
11	-1.113586	0.000000	1.293556	.841723	.297555	0.000000	-.121986	.977644	.822905	1.047401
12	-1.113586	0.000000	1.294435	.833527	.189119	0.000000	-.077615	.987859	.823407	1.062496
13	-1.113586	0.000000	1.294891	.829225	.097820	0.000000	-.040165	.992463	.822975	1.069659
14	-1.113586	0.000000	1.295127	.828550	.040477	0.000000	-.016625	.993839	.823445	1.071491
15	-1.113586	0.000000	1.295250	.827862	0.000000	0.000000	0.000000	.994122	.822996	1.072153

J= 9 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	1.670379	0.000000	.841704	.527938	.002460	0.000000	.937119	.788777	1.003994
2	-1.113586	1.670379	.623478	.849026	.525025	.002670	-.085227	.939028	.797259	1.002559
3	-1.113586	1.670379	.946871	.861499	.516862	.003225	-.144075	.942198	.811702	1.000092
4	-1.113586	1.670379	1.114613	.865211	.504783	.003987	-.170510	.943136	.816012	.999368
5	-1.113586	1.670379	1.201618	.866239	.489645	.004801	-.181340	.944654	.818296	1.000502
6	-1.113586	1.670379	1.246748	.866591	.475651	.005538	-.185100	.946868	.820548	1.002684
7	-1.113586	1.670379	1.270156	.865099	.463492	.006093	-.184880	.949012	.820989	1.005647
8	-1.113586	1.670379	1.282298	.863280	.450359	.006359	-.182155	.952128	.821953	1.009798
9	-1.113586	1.670379	1.288595	.858808	.427619	.006168	-.174210	.956860	.821759	1.016928
10	-1.113586	1.670379	1.291862	.851698	.381075	.005330	-.155900	.965550	.822357	1.029581
11	-1.113586	1.670379	1.293556	.840970	.297029	.003849	-.121770	.977420	.821981	1.047536
12	-1.113586	1.670379	1.294435	.832806	.188773	.002241	-.077473	.987600	.822479	1.062584
13	-1.113586	1.670379	1.294891	.828523	.097642	.001099	-.040092	.992188	.822051	1.069725
14	-1.113586	1.670379	1.295127	.827849	.040404	.000445	-.016595	.993559	.822517	1.071552
15	-1.113586	1.670379	1.295250	.827166	0.000000	0.000000	0.000000	.993841	.822071	1.072211

J= 9 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	3.246102	0.000000	.839667	.524507	.003281	0.000000	.937544	.787225	1.005423
2	-1.113586	3.246102	.623478	.846914	.521646	.003590	-.084894	.939416	.795604	1.003974
3	-1.113586	3.246102	.946871	.859217	.513601	.004433	-.143409	.942499	.809811	1.001474
4	-1.113586	3.246102	1.114613	.862842	.501643	.005618	-.169607	.943352	.813964	1.000694
5	-1.113586	3.246102	1.201618	.863888	.486622	.006897	-.180331	.944807	.816207	1.001751
6	-1.113586	3.246102	1.246748	.864284	.472768	.008053	-.184050	.946953	.818436	1.003843
7	-1.113586	3.246102	1.270156	.862862	.460783	.008921	-.183842	.949020	.818874	1.006697
8	-1.113586	3.246102	1.282298	.861126	.447865	.009312	-.181171	.952045	.819831	1.010720
9	-1.113586	3.246102	1.288595	.856761	.425375	.008954	-.173310	.956673	.819639	1.017699
10	-1.113586	3.246102	1.291862	.849766	.379127	.007572	-.155110	.965244	.820232	1.030191
11	-1.113586	3.246102	1.293556	.839164	.295479	.005285	-.121138	.976996	.819860	1.047982
12	-1.113586	3.246102	1.294435	.831091	.187749	.002976	-.077054	.987081	.820354	1.062902
13	-1.113586	3.246102	1.294891	.826854	.097105	.001437	-.039872	.991626	.819929	1.069981
14	-1.113586	3.246102	1.295127	.826188	.040182	.000580	-.016504	.992984	.820392	1.071792
15	-1.113586	3.246102	1.295250	.825511	0.000000	0.000000	0.000000	.993263	.819950	1.072445

J= 9 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	3.572277	0.000000	.838215	.517864	.002100	0.000000	.939201	.787252	1.007898
2	-1.113586	3.572277	.623478	.845466	.515136	.002344	-.084828	.941046	.795622	1.006404
3	-1.113586	3.572277	.946871	.857729	.507389	.003052	-.143059	.944038	.809728	1.003805
4	-1.113586	3.572277	1.114613	.861307	.495746	.004066	-.168779	.944767	.813735	1.002909
5	-1.113586	3.572277	1.201618	.862365	.481019	.005163	-.179055	.946107	.815890	1.003839
6	-1.113586	3.572277	1.246748	.862823	.467471	.006163	-.182478	.948145	.818081	1.005787
7	-1.113586	3.572277	1.270156	.861502	.455834	.006912	-.182142	.950092	.818507	1.008471
8	-1.113586	3.572277	1.282298	.859897	.443376	.007198	-.179498	.952972	.819457	1.012282
9	-1.113586	3.572277	1.288595	.855699	.421548	.006717	-.171819	.957423	.819266	1.019003
10	-1.113586	3.572277	1.291862	.848878	.376188	.005240	-.153938	.965811	.819856	1.031227
11	-1.113586	3.572277	1.293556	.838423	.293450	.003078	-.120318	.977412	.819485	1.048799
12	-1.113586	3.572277	1.294435	.830449	.186492	.001301	-.076542	.987390	.819977	1.063564

13	-1.113586	3.572277	1.294891	.826262	.096458	.000466	-.039607	.991882	.819554	1.070564
14	-1.113586	3.572277	1.295127	.825609	.039916	.000154	-.016395	.993223	.820015	1.072351
15	-1.113586	3.572277	1.295250	.824937	0.000000	0.000000	0.000000	.993500	.819574	1.072999

J= 9 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	3.670124	0.000000	.836378	.505993	.000807	0.000000	.942073	.787929	1.011866
2	-1.113586	3.670124	.623478	.843702	.503531	.000953	-.084710	.943899	.796370	1.010299
3	-1.113586	3.670124	.946871	.856135	.496395	.001361	-.142599	.946836	.810619	1.007529
4	-1.113586	3.670124	1.114613	.859965	.485411	.001809	-.167696	.947492	.814810	1.006429
5	-1.113586	3.670124	1.201618	.861257	.471273	.002167	-.177257	.948734	.817103	1.007143
6	-1.113586	3.670124	1.246748	.861889	.458279	.002463	-.180075	.950641	.819348	1.008872
7	-1.113586	3.670124	1.270156	.860744	.447186	.002680	-.179366	.952434	.819802	1.011313
8	-1.113586	3.670124	1.282298	.859331	.435445	.002640	-.177[illegible]	.955114	.820759	1.014825
9	-1.113586	3.670124	1.288595	.856411	.414915	.002116	[illegible]	.959276	.820575	1.021113
10	-1.113586	3.670124	1.291862	.848923	.371800	.000995	[illegible]	.967303	.821165	1.032797
11	-1.113586	3.670124	1.293556	.838738	.291385	-.000370	[illegible]	.978611	.820798	1.049928
12	-1.113586	3.670124	1.294435	.830904	.185634	-.001043	-.[illegible]193	.988427	.821288	1.064447
13	-1.113586	3.670124	1.294891	.826785	.096081	-.000815	-.039452	.992844	.820868	1.071331
14	-1.113586	3.670124	1.295127	.826148	.039769	-.000391	-.016335	.994163	.821326	1.073086
15	-1.113586	3.670124	1.295250	.825483	0.000000	0.000000	0.000000	.994434	.820888	1.073725

J= 9 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	3.699476	0.000000	.831436	.479446	.000362	0.000000	.947023	.787389	1.019598
2	-1.113586	3.699476	.623478	.838700	.477585	.000459	-.082236	.948810	.795767	1.017973
3	-1.113586	3.699476	.946871	.851053	.471873	.000709	-.138038	.951607	.809868	1.015021
4	-1.113586	3.699476	1.114613	.854980	.462451	.000905	-.161566	.952033	.813969	1.013607
5	-1.113586	3.699476	1.201618	.856534	.449551	.000961	-.170229	.953024	.816298	1.013925
6	-1.113586	3.699476	1.246748	.857480	.437431	.000890	-.172625	.954693	.818630	1.015253
7	-1.113586	3.699476	1.270156	.856597	.426879	.000687	-.171674	.956257	.819127	1.017335
8	-1.113586	3.699476	1.282298	.855449	.415520	.000312	-.168825	.958693	.820113	1.020474
9	-1.113586	3.699476	1.288595	.852017	.396310	-.000216	-.16[illegible]	.962348	.819937	1.026013
10	-1.113586	3.699476	1.291862	.846547	.357374	-.000707	-.1[illegible]	.969272	.820535	1.036061
11	-1.113586	3.699476	1.293556	.837651	.284071	-.001101	-.116452	.979132	.820170	1.051032
12	-1.113586	3.699476	1.294435	.830571	.183599	-.001217	-.075343	.988072	.820664	1.064236
13	-1.113586	3.699476	1.294891	.826708	.095486	-.000819	-.039206	.992179	.820242	1.070654
14	-1.113586	3.699476	1.295127	.826146	.039551	-.000364	-.016245	.993411	.820703	1.072275
15	-1.113586	3.699476	1.295250	.825493	0.000000	0.000000	0.000000	.993664	.820263	1.072888

J= 9 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	3.708281	0.000000	.822587	.415027	.000048	0.000000	.957848	.787913	1.035676
2	-1.113586	3.708281	.623478	.829745	.414486	.000093	-.072464	.959753	.796351	1.034145
3	-1.113586	3.708281	.946871	.842018	.411812	.000200	-.121145	.962668	.810584	1.031[illegible]2
4	-1.113586	3.708281	1.114613	.846169	.405553	.000244	-.140667	.962892	.814769	1.029425
5	-1.113586	3.708281	1.201618	.848083	.395144	.000220	-.147830	.963426	.817065	1.029065
6	-1.113586	3.708281	1.246748	.849402	.384686	.000170	-.150090	.964587	.819323	1.029666
7	-1.113586	3.708281	1.270156	.848866	.374652	.000079	-.149382	.965767	.819806	1.031185
8	-1.113586	3.708281	1.282298	.848021	.362203	-.000255	-.146448	.967896	.820797	1.033870
9	-1.113586	3.708281	1.288595	.845439	.341262	-.000986	-.139077	.970663	.820637	1.038091
10	-1.113586	3.708281	1.291862	.842580	.305704	-.001240	-.124914	.974669	.821237	1.043790
11	-1.113586	3.708281	1.293556	.838062	.248321	-.000315	-.101542	.979490	.820874	1.051210
12	-1.113586	3.708281	1.294435	.833956	.170041	.000447	-.069503	.984905	.821367	1.059101
13	-1.113586	3.708281	1.294891	.830986	.091320	.000418	-.037440	.987924	.820951	1.063864
14	-1.113586	3.708281	1.295127	.830668	.038017	.000161	-.015615	.988853	.821408	1.065028
15	-1.113586	3.708281	1.295250	.830071	0.000000	0.000000	0.000000	.989038	.820972	1.065533

J= 9 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	3.710922	0.000000	.808333	.280633	.000020	0.000000	.974093	.787392	1.060631
2	-1.113586	3.710922	.623478	.815026	.281905	.000033	-.049019	.976373	.795770	1.059613
3	-1.113586	3.710922	.946871	.826537	.283435	.000060	-.081562	.979834	.809870	1.057420
4	-1.113586	3.710922	1.114613	.830565	.281555	.000060	-.093532	.980023	.813972	1.055569
5	-1.113586	3.710922	1.201618	.832925	.274940	.000050	-.098766	.980043	.816303	1.054394
6	-1.113586	3.710922	1.246748	.834879	.267611	.000040	-.101185	.[illegible]0543	.818635	1.053943
7	-1.113586	3.710922	1.270156	.834918	.259521	.000027	-.100804	.981085	.819125	1.054506
8	-1.113586	3.710922	1.282298	.834720	.246136	-.000031	-.097490	.982485	.820099	1.056111
9	-1.113586	3.710922	1.288595	.833986	.221402	-.000486	-.089523	.983156	.819938	1.057204

10	-1.113586	3.710922	1.291862	836093	.188616	-.001603	-.077850	.981418	.820557	1.054271
11	-1.113586	3.710922	1.293556	839207	.153336	-.000521	-.063622	.977338	.820189	1.048327
12	-1.113586	3.710922	1.294435	841525	.107988	.003998	-.044602	.975241	.820689	1.044925
13	-1.113586	3.710922	1.294891	840336	.063989	.004708	-.026330	.976139	.820286	1.046479
14	-1.113586	3.710922	1.295127	840192	.027521	.001832	-.011338	.976851	.820743	1.047314
15	-1.113586	3.710922	1.295250	839606	0.000000	0.000000	0.000000	.977018	.820310	1.047786

J= 9 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	3.711715	0.000000	800505	.114293	.000004	0.000000	.984268	.787911	1.075890
2	-1.113586	3.711715	.623478	806847	.115526	.000007	-.019796	.986989	.796349	1.075464
3	-1.113586	3.711715	.946871	817769	.117553	.000011	-.032761	.991212	.810582	1.074273
4	-1.113586	3.711715	1.114613	821638	.117639	.000006	-.036751	.991638	.814768	1.072707
5	-1.113586	3.711715	1.201618	824154	.114961	.000006	-.039171	.991400	.817066	1.071138
6	-1.113586	3.711715	1.246748	826369	.111993	.000007	-.040636	.991478	.819327	1.070073
7	-1.113586	3.711715	1.270156	826845	.108594	.000005	-.040698	.991500	.819817	1.069851
8	-1.113586	3.711715	1.282298	827528	.101893	.000006	-.038901	.991878	.820807	1.069905
9	-1.113586	3.711715	1.288595	828864	.084500	.000003	-.033061	.990054	.820619	1.067248
10	-1.113586	3.711715	1.291862	834711	.060069	.000003	-.026896	.983845	.821226	1.057577
11	-1.113586	3.711715	1.293556	841013	.057196	.000001	-.029621	.976148	.820953	1.046152
12	-1.113586	3.711715	1.294435	844408	.056684	-.000001	-.026532	.972915	.821538	1.041008
13	-1.113586	3.711715	1.294891	843422	.033304	-.000005	-.014334	.973554	.821117	1.042178
14	-1.113586	3.711715	1.295127	843806	.014469	-.000004	-.005960	.973670	.821589	1.042113
15	-1.113586	3.711715	1.295250	843316	0.000000	0.000000	0.000000	.973697	.821134	1.042384

J= 9 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.113586	3.711952	0.000000	798460	0.000000	0.000000	0.000000	.986138	.787391	1.079037
2	-1.113586	3.711952	.623478	804654	0.000000	0.000000	0.000000	.988958	.795769	1.078783
3	-1.113586	3.711952	.946871	815284	0.000000	0.000000	0.000000	.993358	.809869	1.077909
4	-1.113586	3.711952	1.114613	819015	0.000000	0.000000	0.000000	.993842	.813971	1.076466
5	-1.113586	3.711952	1.201618	821594	0.000000	0.000000	0.000000	.993560	.816303	1.074809
6	-1.113586	3.711952	1.246748	823936	0.000000	0.000000	0.000000	.993570	.818638	1.073596
7	-1.113586	3.711952	1.270156	824497	0.000000	0.000000	0.000000	.993495	.819134	1.073223
8	-1.113586	3.711952	1.282298	825367	0.000000	0.000000	0.000000	.993643	.820120	1.072930
9	-1.113586	3.711952	1.288595	827207	0.000000	0.000000	0.000000	.991257	.819975	1.069401
10	-1.113586	3.711952	1.291862	833443	0.000000	0.000000	0.000000	.984579	.820591	1.059010
11	-1.113586	3.711952	1.293556	839796	0.000000	0.000000	0.000000	.976697	.820227	1.047346
12	-1.113586	3.711952	1.294435	843412	0.000000	0.000000	0.000000	.973162	.820776	1.041764
13	-1.113586	3.711952	1.294891	842879	0.000000	0.000000	0.000000	.973251	.820333	1.042123
14	-1.113586	3.711952	1.295127	843596	0.000000	0.000000	0.000000	.973849	.821535	1.042408
15	-1.113586	3.711952	1.295250	843456	0.000000	0.000000	0.000000	.973773	.821335	1.042396

J= 10 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.881589	0.000000	0.000000	818086	580507	0.000000	0.000000	.926131	.757655	1.003582
2	-.881589	0.000000	.577608	823202	581384	0.000000	-.089107	.926957	.763073	1.001976
3	-.881589	0.000000	.877208	831279	581614	0.000000	-.152256	.928011	.771436	.999204
4	-.881589	0.000000	1.032608	832549	576710	0.000000	-.184778	.927694	.772350	.998253
5	-.881589	0.000000	1.113213	833428	565281	0.000000	-.201633	.929019	.774271	.999257
6	-.881589	0.000000	1.155022	833506	553221	0.000000	-.208936	.931047	.776034	1.001402
7	-.881589	0.000000	1.176708	832211	542380	0.000000	-.211010	.933201	.776620	1.004343
8	-.881589	0.000000	1.187956	830280	530807	0.000000	-.209884	.936285	.777378	1.008598
9	-.881589	0.000000	1.193790	825588	509772	0.000000	-.203311	.941617	.777388	1.016644
10	-.881589	0.000000	1.196817	816580	462431	0.000000	-.185332	.952520	.777808	1.032938
11	-.881589	0.000000	1.198386	802073	368147	0.000000	-.147909	.969552	.777652	1.058975
12	-.881589	0.000000	1.199201	789672	237365	0.000000	-.095474	.985193	.777980	1.082786
13	-.881589	0.000000	1.199623	783594	123812	0.000000	-.049826	.992552	.777758	1.094251
14	-.881589	0.000000	1.199842	782133	051483	0.000000	-.020726	.994765	.778038	1.097509
15	-.881589	0.000000	1.199955	781520	0.000000	0.000000	0.000000	.995226	.777789	1.098362

J= 10 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.881589	1.670379	0.000000	817228	579523	.002564	0.000000	.926165	.756888	1.004040
2	-.881589	1.670379	.577608	822323	580404	.002758	-.088945	.926983	.762280	1.002432
3	-.881589	1.670379	.877208	830371	580646	.003273	-.151981	.928024	.770604	.999655
4	-.881589	1.670379	1.032608	831655	575757	.003986	-.184463	.927698	.771525	.998687
5	-.881589	1.670379	1.113213	832560	564353	.004756	-.201308	.929011	.773458	.999666
6	-.881589	1.670379	1.155022	832655	552330	.005461	-.208604	.931018	.775217	1.001779

7	-.881589	1.670379	1.176708	.831386	.541534	.005997	-.210685	.933147	.775806	1.004683
8	-.881589	1.670379	1.187956	.829480	.530013	.006246	-.209572	.936200	.776560	1.008896
9	-.881589	1.670379	1.193790	.824824	.509031	.006034	-.203017	.941501	.776572	1.016896
10	-.881589	1.670379	1.196817	.815851	.461749	.005163	-.185059	.952367	.776989	1.033142
11	-.881589	1.670379	1.198386	.801391	.367573	.003661	-.147678	.969359	.776836	1.059124
12	-.881589	1.670379	1.199201	.789025	.236968	.002084	-.095314	.984962	.777160	1.082887
13	-.881589	1.670379	1.199623	.782969	.123596	.001010	-.049739	.992303	.776942	1.094325
14	-.881589	1.670379	1.199842	.781510	.051391	.000407	-.020689	.994509	.777218	1.097577
15	-.881589	1.670379	1.199955	.780902	0.000000	0.000000	0.000000	.994968	.776973	1.098426

J= 10 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.881589	3.246102	0.000000	.815336	.576375	.003377	0.000000	.926593	.755485	1.005437
2	-.881589	3.246102	.577608	.820379	.577286	.003668	-.088632	.927385	.760807	1.003816
3	-.881589	3.246102	.877208	.828319	.577592	.004454	-.151369	.928358	.768976	1.001005
4	-.881589	3.246102	1.032608	.829563	.572773	.005548	-.183641	.927966	.769806	.999982
5	-.881589	3.246102	1.113213	.830489	.561455	.006735	-.200373	.929220	.771707	1.000887
6	-.881589	3.246102	1.155022	.830623	.549541	.007823	-.207615	.931161	.773444	1.002912
7	-.881589	3.246102	1.176708	.829422	.538887	.008645	-.209695	.933217	.774031	1.005709
8	-.881589	3.246102	1.187956	.827591	.527558	.009003	-.208623	.936182	.774776	1.009796
9	-.881589	3.246102	1.193790	.823021	.506811	.008605	-.202144	.941388	.774792	1.017659
10	-.881589	3.246102	1.196817	.814152	.459794	.007178	-.184282	.952159	.775202	1.033777
11	-.881589	3.246102	1.198386	.799806	.365944	.004878	-.147027	.969053	.775054	1.059628
12	-.881589	3.246102	1.199201	.787537	.235815	.002659	-.094852	.984552	.775372	1.083254
13	-.881589	3.246102	1.199623	.781541	.122959	.001260	-.049484	.991833	.775159	1.094606
14	-.881589	3.246102	1.199842	.780094	.051121	.000505	-.020580	.994020	.775429	1.097833
15	-.881589	3.246102	1.199955	.779496	0.000000	0.000000	0.000000	.994475	.775189	1.098673

J= 10 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.881589	3.573991	0.000000	.813999	.570424	.002123	0.000000	.928253	.755597	1.007899
2	-.881589	3.573991	.577608	.819058	.571444	.002373	-.088539	.929022	.760923	1.006237
3	-.881589	3.573991	.877208	.827017	.571963	.003053	-.151054	.929929	.769067	1.003330
4	-.881589	3.573991	1.032608	.828316	.567321	.003940	-.182971	.929456	.769884	1.002191
5	-.881589	3.573991	1.113213	.829295	.556178	.004858	-.199298	.930621	.771760	1.002973
6	-.881589	3.573991	1.155022	.829479	.544479	.005712	-.206217	.932459	.773455	1.004864
7	-.881589	3.573991	1.176708	.828378	.534090	.006352	-.208135	.934406	.774041	1.007498
8	-.881589	3.573991	1.187956	.826661	.523165	.006573	-.207057	.937229	.774771	1.011381
9	-.881589	3.573991	1.193790	.822254	.503018	.006035	-.200724	.942283	.774796	1.019011
10	-.881589	3.573991	1.196817	.813502	.456700	.004491	-.183087	.952911	.775195	1.034925
11	-.881589	3.573991	1.198386	.799306	.363405	.002287	-.146024	.969662	.775057	1.060560
12	-.881589	3.573991	1.199201	.787206	.233955	.000671	-.094108	.984957	.775364	1.083882
13	-.881589	3.573991	1.199623	.781325	.121939	.000109	-.049074	.992111	.775162	1.095034
14	-.881589	3.573991	1.199842	.779900	.050692	.000002	-.020408	.994257	.775421	1.098204
15	-.881589	3.573991	1.199955	.779319	0.000000	0.000000	0.000000	.994704	.775191	1.099025

J= 10 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.881589	3.671141	0.000000	.812060	.559221	.000877	0.000000	.931225	.756210	1.012090
2	-.881589	3.671141	.577608	.817179	.560558	.001059	-.088231	.931970	.761587	1.010357
3	-.881589	3.671141	.877208	.825304	.561752	.001522	-.150391	.932815	.769856	1.007279
4	-.881589	3.671141	1.032608	.826918	.557701	.001892	-.181886	.932293	.770930	1.005930
5	-.881589	3.671141	1.113213	.828205	.546938	.001991	-.197725	.933403	.773049	1.006501
6	-.881589	3.671141	1.155022	.828581	.535546	.001961	-.204126	.935140	.774840	1.008191
7	-.881589	3.671141	1.176708	.827647	.525466	.001879	-.205646	.936968	.775479	1.010618
8	-.881589	3.671141	1.187956	.826082	.514973	.001624	-.204347	.939638	.776218	1.014265
9	-.881589	3.671141	1.193790	.821891	.495513	.000956	-.198027	.944478	.776258	1.021565
10	-.881589	3.671141	1.196817	.813452	.450036	-.000334	-.180565	.954766	.776657	1.036965
11	-.881589	3.671141	1.198386	.799783	.357528	-.001948	-.143720	.970926	.776530	1.061689
12	-.881589	3.671141	1.199201	.788282	.229683	-.002458	-.092405	.985472	.776830	1.083856
13	-.881589	3.671141	1.199623	.782716	.119689	-.001659	-.048172	.992230	.776634	1.094386
14	-.881589	3.671141	1.199842	.781371	.049773	-.000758	-.020037	.994261	.776886	1.097381
15	-.881589	3.671141	1.199955	.780814	0.000000	0.000000	0.000000	.994684	.776663	1.098161

J= 10 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.881589	3.699926	0.000000	.806555	.531867	.000438	0.000000	.936897	.755659	1.021029
2	-.881589	3.699926	.577608	.811632	.534068	.000558	-.085100	.937599	.760985	1.019284
3	-.881589	3.699926	.877208	.819691	.537269	.000867	-.144805	.938280	.769099	1.015950

4	-.881589	3.699926	1.032608	821386	.535247	.001081	-.174776	.937492	.770043	1.014259
5	-.881589	3.699926	1.113213	822938	.525772	.001063	-.190098	.938366	.772217	1.014438
6	-.881589	3.699926	1.155022	823673	.514936	.000755	-.196526	.939934	.774198	1.015770
7	-.881589	3.699926	1.176708	822967	.504835	.000065	-.198072	.941650	.774947	1.017974
8	-.881589	3.699926	1.187956	821520	.493595	-.000936	-.196511	.944306	.775766	1.021563
9	-.881589	3.699926	1.193790	817595	.472434	-.002003	-.189306	.948924	.775836	1.028527
10	-.881589	3.699926	1.196817	810389	.424830	-.002974	-.170701	.957886	.776260	1.041925
11	-.881589	3.699926	1.198386	799503	.333094	-.004116	-.134031	.970770	.776134	1.061667
12	-.881589	3.699926	1.199201	790790	.213001	-.004473	-.085741	.981858	.776444	1.078510
13	-.881589	3.699926	1.199623	786419	.111235	-.002906	-.044781	.987055	.776239	1.086625
14	-.881589	3.699926	1.199842	785402	.046374	-.001283	-.018670	.988664	.776499	1.088960
15	-.881589	3.699926	1.199955	784897	0.000000	0.000000	0.000000	.989005	.776267	1.089616

J= 10 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.881589	3.708455	0.000000	.795779	.461189	.000087	0.000000	.950239	.756180	1.041156
2	-.881589	3.708455	.577608	.800723	.465281	.000139	-.073515	.951086	.761556	1.039505
3	-.881589	3.708455	.877208	.808682	.472845	.000267	-.124857	.951929	.769808	1.036318
4	-.881589	3.708455	1.032608	.810603	.475274	.000322	-.150249	.950988	.770874	1.034313
5	-.881589	3.708455	1.113213	.812432	.469077	.000287	-.163882	.951451	.772989	1.033884
6	-.881589	3.708455	1.155022	.813392	.460088	.000205	-.170213	.952561	.774805	1.034601
7	-.881589	3.708455	1.176708	.812856	.449892	-.000005	-.172338	.954097	.775543	1.036542
8	-.881589	3.708455	1.187956	.811363	.435468	-.000870	-.170746	.956925	.776414	1.040379
9	-.881589	3.708455	1.193790	.807994	.406819	-.002773	-.161740	.961067	.776536	1.046624
10	-.881589	3.708455	1.196817	.804621	.348669	-.003841	-.139417	.965631	.776968	1.053355
11	-.881589	3.708455	1.198386	.802597	.250683	-.003714	-.100199	.967908	.776840	1.056903
12	-.881589	3.708455	1.199201	.802591	.148258	-.004702	-.059365	.968289	.777141	1.057322
13	-.881589	3.708455	1.199623	.802522	.076691	-.003631	-.030817	.968128	.776945	1.057183
14	-.881589	3.708455	1.199842	.802856	.032099	-.001646	-.012922	.968043	.777200	1.056914
15	-.881589	3.708455	1.199955	.802628	0.000000	0.000000	0.000000	.968038	.776974	1.057028

J= 10 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.881589	3.710982	0.000000	.778116	.308368	.000039	0.000000	.971140	.755660	1.073654
2	-.881589	3.710982	.577608	.782414	.314377	.000052	-.047035	.972613	.760986	1.072915
3	-.881589	3.710982	.877208	.789182	.326634	.000080	-.079610	.974553	.769099	1.071358
4	-.881589	3.710982	1.032608	.790508	.334186	.000084	-.095443	.974116	.770046	1.070158
5	-.881589	3.710982	1.113213	.792474	.332473	.000076	-.105829	.974446	.772224	1.069458
6	-.881589	3.710982	1.155022	.793991	.327162	.000059	-.111459	.975078	.774203	1.069333
7	-.881589	3.710982	1.176708	.793902	.319128	.000017	-.113028	.976115	.774940	1.070518
8	-.881589	3.710982	1.187956	.792640	.301694	-.000151	-.110111	.978689	.775749	1.074025
9	-.881589	3.710982	1.193790	.791232	.262300	-.000908	-.099471	.980613	.775892	1.076901
10	-.881589	3.710982	1.196817	.797107	.192599	-.002446	-.075948	.974033	.776408	1.066516
11	-.881589	3.710982	1.198386	.814878	.059193	-.001292	-.023939	.952593	.776247	1.033880
12	-.881589	3.710982	1.199201	.841802	-.096093	.003611	.039288	.922493	.776557	.988278
13	-.881589	3.710982	1.199623	.848660	-.074874	.004359	.030122	.914742	.776305	.976798
14	-.881589	3.710982	1.199842	.848302	-.029240	.001524	.011756	.915544	.776657	.977820
15	-.881589	3.710982	1.199955	.847483	0.000000	0.000000	0.000000	.916052	.776339	.978741

J= 10 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.881589	3.711731	0.000000	.768702	.122867	.000008	0.000000	.983708	.756178	1.092856
2	-.881589	3.711731	.577608	.772413	.126570	.000010	-.017745	.985942	.761554	1.093230
3	-.881589	3.711731	.877208	.778014	.134362	.000013	-.029723	.989449	.769806	1.093953
4	-.881589	3.711731	1.032608	.778570	.139619	.000010	-.035141	.990113	.770873	1.094374
5	-.881589	3.711731	1.113213	.780226	.139761	.000013	-.039862	.990725	.772989	1.094120
6	-.881589	3.711731	1.155022	.781726	.137986	.000014	-.042646	.991152	.774809	1.093751
7	-.881589	3.711731	1.176708	.782011	.134480	.000013	-.043683	.991739	.775551	1.094239
8	-.881589	3.711731	1.187956	.781889	.125266	.000013	-.042028	.992997	.776413	1.095696
9	-.881589	3.711731	1.193790	.784377	.098044	.000010	-.034279	.989987	.776523	1.090987
10	-.881589	3.711731	1.196817	.800681	.048613	.000011	-.020555	.970450	.777021	1.060692
11	-.881589	3.711731	1.198386	.828049	-.001259	.000011	-.005872	.938356	.777005	1.011918
12	-.881589	3.711731	1.199201	.852412	-.066130	.000010	.023294	.912025	.777422	.972181
13	-.881589	3.711731	1.199623	.854751	-.036543	-.000001	.014105	.909295	.777220	.968209
14	-.881589	3.711731	1.199842	.855060	-.012755	.000004	.005105	.909279	.777488	.968052
15	-.881589	3.711731	1.199955	.854718	0.000000	0.000000	0.000000	.909360	.777246	.968293

J= 10 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT

1	-.881589	3.711952	0.000000	766452	0.000000	0.000000	0.000000	.985918	.755659	1.096596
2	-.881589	3.711952	.577608	769975	0.000000	0.000000	0.000000	.988325	.760986	1.097259
3	-.881589	3.711952	.877208	775141	0.000000	0.000000	0.000000	.992204	.769098	1.098623
4	-.881589	3.711952	1.032608	775363	0.000000	0.000000	0.000000	.993141	.770045	1.099534
5	-.881589	3.711952	1.113213	777005	0.000000	0.000000	0.000000	.993845	.772223	1.099383
6	-.881589	3.711952	1.155022	778675	0.000000	0.000000	0.000000	.994260	.774205	1.098898
7	-.881589	3.711952	1.176708	779033	0.000000	0.000000	0.000000	.994757	.774948	1.099246
8	-.881589	3.711952	1.187956	779163	0.000000	0.000000	0.000000	.995650	.775774	1.100159
9	-.881589	3.711952	1.193790	782566	0.000000	0.000000	0.000000	.991508	.775920	1.093674
10	-.881589	3.711952	1.196817	799406	0.000000	0.000000	0.000000	.971195	.776379	1.062184
11	-.881589	3.711952	1.198386	826477	0.000000	0.000000	0.000000	.939214	.776239	1.013613
12	-.881589	3.711952	1.199201	848946	0.000000	0.000000	0.000000	.915018	.776801	.976962
13	-.881589	3.711952	1.199623	852982	0.000000	0.000000	0.000000	.910499	.776639	.970295
14	-.881589	3.711952	1.199842	854742	0.000000	0.000000	0.000000	.910841	.778534	.969859
15	-.881589	3.711952	1.199955	854730	0.000000	0.000000	0.000000	.910101	.777890	.969076

J= 11 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	0.000000	0.000000	788094	639710	0.000000	0.000000	.912600	.719215	1.003805
2	-.649592	0.000000	.533547	789304	646632	0.000000	-.086778	.911681	.719593	1.002178
3	-.649592	0.000000	.810293	788297	661876	0.000000	-.147547	.908715	.716337	.999429
4	-.649592	0.000000	.953839	781786	673092	0.000000	-.180852	.904863	707409	.998499
5	-.649592	0.000000	1.028295	778559	673193	0.000000	-.201143	.904335	.704078	.999568
6	-.649592	0.000000	1.066915	775958	668051	0.000000	-.210950	.905165	.702370	1.001826
7	-.649592	0.000000	1.086947	773610	661274	0.000000	-.215014	.906744	.701466	1.004792
8	-.649592	0.000000	1.097337	770971	652832	0.000000	-.215632	.909409	.701128	1.009123
9	-.649592	0.000000	1.102726	765807	634316	0.000000	-.211290	.915247	.700902	1.018335
10	-.649592	0.000000	1.105522	754266	584480	0.000000	-.195605	.929275	.700920	1.040243
11	-.649592	0.000000	1.106972	734489	471398	0.000000	-.158104	.954287	.700913	1.079655
12	-.649592	0.000000	1.107724	716642	304565	0.000000	-.102233	.978222	.701035	1.117678
13	-.649592	0.000000	1.108114	708424	159293	0.000000	-.053491	.989555	.701025	1.135854
14	-.649592	0.000000	1.108316	706065	066491	0.000000	-.022333	.992974	.701104	1.141301
15	-.649592	0.000000	1.108421	705511	0.000000	0.000000	0.000000	.993693	.701062	1.142485

J= 11 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	1.670379	0.000000	787303	638773	.002623	0.000000	.912642	.718526	1.004254
2	-.649592	1.670379	.533547	788508	645686	.002796	-.086635	.911721	.718899	1.002627
3	-.649592	1.670379	.810293	787507	660911	.003263	-.147304	.908753	.715649	.999871
4	-.649592	1.670379	.953839	781034	672117	.003925	-.180571	.904901	.706759	.998926
5	-.649592	1.670379	1.028295	777846	672226	.004655	-.200850	.904367	.703458	.999970
6	-.649592	1.670379	1.066915	775273	667105	.005337	-.210651	.905181	.701762	1.002198
7	-.649592	1.670379	1.086947	772953	660363	.005862	-.214718	.906738	.700866	1.005126
8	-.649592	1.670379	1.097337	770342	651968	.006105	-.215346	.909374	.700529	1.009413
9	-.649592	1.670379	1.102726	765210	633516	.005876	-.211023	.915181	.700306	1.018579
10	-.649592	1.670379	1.105522	753701	583767	.004971	-.195366	.929178	.700322	1.040445
11	-.649592	1.670379	1.106972	733963	470811	.003437	-.157907	.954157	.700317	1.079817
12	-.649592	1.670379	1.107724	716152	304146	.001898	-.102092	.978056	.700437	1.117793
13	-.649592	1.670379	1.108114	707957	159057	.000905	-.053411	.989365	.700428	1.135936
14	-.649592	1.670379	1.108316	705603	066389	.000362	-.022299	.992776	.700506	1.141372
15	-.649592	1.670379	1.108421	705053	0.000000	0.000000	0.000000	.993493	.700465	1.142552

J= 11 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	3.246102	0.000000	785552	635887	.003462	0.000000	.913079	.717271	1.005630
2	-.649592	3.246102	.533547	786758	642776	.003715	-.086373	.912151	.717643	1.003992
3	-.649592	3.246102	.810293	785777	657945	.004395	-.146815	.909165	.714401	1.001204
4	-.649592	3.246102	.953839	779367	669113	.005346	-.179914	.905287	.705551	1.000206
5	-.649592	3.246102	1.028295	776236	669244	.006400	-.200068	.904712	.702271	1.001182
6	-.649592	3.246102	1.066915	773725	664181	.007400	-.209800	.905474	.700588	1.003325
7	-.649592	3.246102	1.086947	771481	657540	.008173	-.213846	.906967	.699708	1.006147
8	-.649592	3.246102	1.097337	768946	649308	.008508	-.214496	.909521	.699373	1.010309
9	-.649592	3.246102	1.102726	763901	631079	.008078	-.210228	.915246	.699157	1.019349
10	-.649592	3.246102	1.105522	752470	581586	.006585	-.194645	.929166	.699170	1.041113
11	-.649592	3.246102	1.106972	732845	468919	.004246	-.157277	.954048	.699169	1.080353
12	-.649592	3.246102	1.107724	715162	302730	.002165	-.101618	.977798	.699285	1.118118
13	-.649592	3.246102	1.108114	707050	158253	.000986	-.053142	.989010	.699280	1.136111
14	-.649592	3.246102	1.108316	704717	066044	.000388	-.022183	.992388	.699353	1.141499

	15	-.649592	3.246102	1.108421	.704177	0 000000	0.000000	0.000000	.993097	.699316	1.142665

J= 11 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	3.575745	0.000000	.784234	630598	.002294	0.000000	.914700	.717339	1.008093
2	-.649592	3.575745	.533547	.785513	637529	.002502	-.086274	.913776	.717783	1.006418
3	-.649592	3.575745	.810293	.784736	652720	.003019	-.146643	.910800	.714738	1.003538
4	-.649592	3.575745	.953839	.778620	663822	.003577	-.179628	.906945	.706166	1.002422
5	-.649592	3.575745	1.028295	.775669	663944	.004076	-.199476	.906342	.703021	1.003278
6	-.649592	3.575745	1.066915	.773232	658966	.004549	-.208848	.907026	.701342	1.005301
7	-.649592	3.575745	1.086947	.771095	652480	.004901	-.212656	.908440	.700493	1.007983
8	-.649592	3.575745	1.097337	.768535	644469	.004944	-.213175	.910894	.700145	1.011998
9	-.649592	3.575745	1.102726	.763674	626348	.004255	-.208816	.916562	.699955	1.020937
10	-.649592	3.575745	1.105522	.752304	576589	.002516	-.193056	.930411	.699951	1.042599
11	-.649592	3.575745	1.106972	.732993	463780	.000202	-.155584	.954951	.699973	1.081287
12	-.649592	3.575745	1.107724	.715745	298939	-.000956	-.100353	.978098	.700068	1.118096
13	-.649592	3.575745	1.108114	.707882	156244	-.000807	-.052469	.988983	.700083	1.135545
14	-.649592	3.575745	1.108316	.705596	065211	-.000391	-.021903	.992261	.700136	1.140784
15	-.649592	3.575745	1.108421	.705090	0 000000	0.000000	0.000000	.992950	.700120	1.141903

J= 11 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	3.672170	0.000000	.782157	620227	.001134	0.000000	.917706	.717790	1.012480
2	-.649592	3.672170	.533547	.783504	627514	.001314	-.085640	.916758	.718283	1.010737
3	-.649592	3.672170	.810293	.782958	643417	.001733	-.145613	.913727	.715410	1.007676
4	-.649592	3.672170	.953839	.777350	654994	.001815	-.178557	.909879	.707294	1.006322
5	-.649592	3.672170	1.028295	.774930	655214	.001220	-.198482	.909317	.704657	1.006956
6	-.649592	3.672170	1.066915	.772818	650206	.000226	-.207718	.909988	.703255	1.008799
7	-.649592	3.672170	1.086947	.770853	643685	-.000877	-.211203	.911379	.702539	1.011371
8	-.649592	3.672170	1.097337	.768414	635359	-.002000	-.211182	.913890	.702246	1.015444
9	-.649592	3.672170	1.102726	.763310	615482	-.003491	-.205846	.919779	.702076	1.024715
10	-.649592	3.672170	1.105522	.752008	561262	-.005610	-.188263	.933627	.702095	1.046368
11	-.649592	3.672170	1.106972	.734055	445226	-.007756	-.149491	.956497	.702121	1.082411
12	-.649592	3.672170	1.107724	.718729	285973	-.007094	-.096037	.977029	.702219	1.115016
13	-.649592	3.672170	1.108114	.711625	150096	-.004305	-.050412	.986799	.702231	1.130651
14	-.649592	3.672170	1.108316	.709522	062794	-.001901	-.021091	.989802	.702286	1.135434
15	-.649592	3.672170	1.108421	.709047	0 000000	0.000000	0 000000	.990437	.702266	1.136467

J= 11 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	3.700376	0.000000	.776159	592478	.000597	0.000000	.924188	.717317	1.022775
2	-.649592	3.700376	.533547	.777486	600931	.000718	-.081307	.923191	.717768	1.020974
3	-.649592	3.700376	.810293	.776902	619564	.001037	-.137926	.919937	.714701	1.017680
4	-.649592	3.700376	.953839	.771358	633952	.001219	-.169074	.915722	.706350	1.015923
5	-.649592	3.700376	1.028295	.769245	635553	.001034	-.189048	.914923	.703800	1.016152
6	-.649592	3.700376	1.066915	.767632	630701	.000135	-.199498	.915551	.702806	1.017704
7	-.649592	3.700376	1.086947	.765956	623394	-.002037	-.204042	.917086	.702447	1.020301
8	-.649592	3.700376	1.097337	.763300	612440	-.005438	-.204338	.920105	.702317	1.025084
9	-.649592	3.700376	1.102726	.757650	585147	-.009368	-.196771	.926973	.702321	1.035809
10	-.649592	3.700376	1.105522	.746925	514705	-.013534	-.173300	.940324	.702351	1.056736
11	-.649592	3.700376	1.106972	.734167	382379	-.016552	-.128763	.956787	.702442	1.082673
12	-.649592	3.700376	1.107724	.725869	236518	-.015446	-.079572	.967785	.702485	1.100109
13	-.649592	3.700376	1.108114	.721654	126531	-.009496	-.042530	.973516	.702542	1.109204
14	-.649592	3.700376	1.108316	.720081	053561	-.004149	-.017989	.975651	.702548	1.112607
15	-.649592	3.700376	1.108421	.719749	0 000000	0.000000	0.000000	.976141	.702577	1.113372

J= 11 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	3.708627	0.000000	.763196	516060	.000140	0.000000	.940462	.717758	1.047821
2	-.649592	3.708627	.533547	.764360	526831	.000187	-.067026	.939680	.718254	1.046311
3	-.649592	3.708627	.810293	.763691	550941	.000307	-.112949	.936724	.715368	1.043385
4	-.649592	3.708627	.953839	.758442	570972	.000342	-.137788	.932492	.707242	1.041541
5	-.649592	3.708627	1.028295	.756480	576952	.000267	-.154801	.931391	.704579	1.041389
6	-.649592	3.708627	1.066915	.754796	574252	.000124	-.164411	.931662	.703215	1.042621
7	-.649592	3.708627	1.086947	.753021	565962	-.000199	-.170325	.933266	.702768	1.045400
8	-.649592	3.708627	1.097337	.750181	550807	-.001775	-.172609	.937028	.702940	1.051201
9	-.649592	3.708627	1.102726	.744521	516296	-.007957	-.166354	.944347	.703086	1.062627
10	-.649592	3.708627	1.105522	.737389	433162	-.015379	-.141846	.953757	.703289	1.077356
11	-.649592	3.708627	1.106972	.735206	247067	-.019592	-.081436	.956645	.703331	1.081900

12	-.649592	3.708627	1.107724	.744836	.059182	-.021454	-.019457	.944435	.703449	1.062547
13	-.649592	3.708627	1.108114	.751936	.005426	-.016071	-.001763	.935457	.703404	1.048459
14	-.649592	3.708627	1.108316	.754120	.001627	-.006808	-.000549	.932877	.703501	1.044355
15	-.649592	3.708627	1.108421	.754372	0.000000	0.000000	0.000000	.932479	.703437	1.043770

J= 11 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	3.711040	0.000000	.741620	.343629	.000051	0.000000	.967232	.717318	1.090079
2	-.649592	3.711040	.533547	.741885	.355506	.000061	-.037842	.967495	.717770	1.090220
3	-.649592	3.711040	.810293	.739378	.382670	.000086	-.061992	.966629	.714704	1.090720
4	-.649592	3.711040	.953839	.732730	.406368	.000087	-.074264	.964010	.706359	1.091701
5	-.649592	3.711040	1.028295	.730334	.415977	.000076	-.085671	.963691	.703816	1.092771
6	-.649592	3.711040	1.066915	.729101	.416778	.000032	-.092899	.963958	.702823	1.093814
7	-.649592	3.711040	1.086947	.727973	.412222	-.000109	-.096251	.964922	.702437	1.095585
8	-.649592	3.711040	1.097337	.725439	.397539	-.000614	-.096219	.968021	.702240	1.100637
9	-.649592	3.711040	1.102726	.720097	.346903	-.001936	-.087897	.975668	.702576	1.112617
10	-.649592	3.711040	1.105522	.720740	.258391	-.004198	-.073261	.975441	.703039	1.111961
11	-.649592	3.711040	1.106972	.751915	-.088494	-.003951	.035181	.935596	.703489	1.048626
12	-.649592	3.711040	1.107724	.894916	-.647050	.000811	.216889	.785889	.703305	.821577
13	-.649592	3.711040	1.108114	.952477	-.673360	.002750	.226348	.738173	.703093	.752690
14	-.649592	3.711040	1.108316	.882075	-.274193	.000339	.092120	.796631	.702688	.837635
15	-.649592	3.711040	1.108421	.868124	0.000000	0.000000	0.000000	.809888	.703084	.857023

J= 11 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	3.711746	0.000000	.730243	.135455	.000008	0.000000	.982900	.717756	1.114608
2	-.649592	3.711746	.533547	.729671	.141732	.000010	-.012382	.984350	.718252	1.116603
3	-.649592	3.711746	.810293	.725340	.156326	.000012	-.018974	.986249	.715366	1.121424
4	-.649592	3.711746	.953839	.717114	.169161	.000010	-.021555	.986231	.707240	1.126531
5	-.649592	3.711746	1.028295	.713659	.174819	.000014	-.025915	.987276	.704578	1.129905
6	-.649592	3.711746	1.066915	.711874	.175755	.000015	-.028809	.987843	.703220	1.131687
7	-.649592	3.711746	1.086947	.710820	.172166	.000015	-.030825	.988698	.702787	1.133339
8	-.649592	3.711746	1.097337	.709433	.158683	.000015	-.030820	.990935	.703002	1.136791
9	-.649592	3.711746	1.102726	.710769	.118599	.000006	-.025310	.989424	.703252	1.134204
10	-.649592	3.711746	1.105522	.733444	.031063	.000001	-.005924	.959362	.703639	1.086015
11	-.649592	3.711746	1.106972	.784010	-.126060	.000000	.037806	.897508	.703656	.989259
12	-.649592	3.711746	1.107724	.867701	-.409840	-.000001	.134550	.811198	.703878	.858577
13	-.649592	3.711746	1.108114	.875490	-.283764	-.000004	.095003	.803509	.703464	.847404
14	-.649592	3.711746	1.108316	.867733	-.111288	.000002	.037324	.811122	.703838	.858483
15	-.649592	3.711746	1.108421	.865483	0.000000	0.000000	0.000000	.812827	.703488	.861181

J= 11 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.649592	3.711952	0.000000	.727803	0.000000	0.000000	0.000000	.985594	.717318	1.119161
2	-.649592	3.711952	.533547	.726999	0.000000	0.000000	0.000000	.987305	.717770	1.121599
3	-.649592	3.711952	.810293	.722045	0.000000	0.000000	0.000000	.989833	.714703	1.127551
4	-.649592	3.711952	.953839	.713185	0.000000	0.000000	0.000000	.990427	.706358	1.133813
5	-.649592	3.711952	1.028295	.709623	0.000000	0.000000	0.000000	.991816	.703816	1.137680
6	-.649592	3.711952	1.066915	.708147	0.000000	0.000000	0.000000	.992483	.702824	1.139394
7	-.649592	3.711952	1.086947	.707220	0.000000	0.000000	0.000000	.993252	.702447	1.140874
8	-.649592	3.711952	1.097337	.705964	0.000000	0.000000	0.000000	.994833	.702316	1.143502
9	-.649592	3.711952	1.102726	.709104	0.000000	0.000000	0.000000	.990831	.702602	1.136883
10	-.649592	3.711952	1.105522	.733360	0.000000	0.000000	0.000000	.958506	.702929	1.085095
11	-.649592	3.711952	1.106972	.781562	0.000000	0.000000	0.000000	.899550	.703054	.992750
12	-.649592	3.711952	1.107724	.835587	0.000000	0.000000	0.000000	.841605	.703234	.904298
13	-.649592	3.711952	1.108114	.857811	0.000000	0.000000	0.000000	.820808	.704098	.872741
14	-.649592	3.711952	1.108316	.862833	0.000000	0.000000	0.000000	.817306	.705199	.866990
15	-.649592	3.711952	1.108421	.864155	0.000000	0.000000	0.000000	.815067	.704344	.864085

J= 12 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	0.000000	0.000000	.749420	.710088	0.000000	0.000000	.894638	.670459	1.004054
2	-.417595	0.000000	.502575	.745637	.723591	0.000000	-.074966	.891566	.664785	1.002634
3	-.417595	0.000000	.763256	.732236	.755857	0.000000	-.121665	.883000	.646564	1.000232
4	-.417595	0.000000	.898469	.713860	.786589	0.000000	-.143676	.873198	.623341	.999234
5	-.417595	0.000000	.968603	.703281	.801491	0.000000	-.158686	.868831	.611033	1.000193
6	-.417595	0.000000	1.004981	.696054	.805403	0.000000	-.165868	.867181	.603604	1.002426
7	-.417595	0.000000	1.023850	.691569	.803866	0.000000	-.169125	.867393	.599862	1.005267
8	-.417595	0.000000	1.033637	.687670	.799002	0.000000	-.170019	.869185	.597713	1.009625

9	-.417595	0.000000	1.038714	.681514	.781704	0.000000	-.167363	.875745	.596832	1.020912
10	-.417595	0.000000	1.041347	.666355	.723188	0.000000	-.155379	.894791	.596248	1.052542
11	-.417595	0.000000	1.042713	.640171	.577249	0.000000	-.124150	.931409	.596261	1.113324
12	-.417595	0.000000	1.043421	.617718	.364079	0.000000	-.078303	.965066	.596138	1.170149
13	-.417595	0.000000	1.043788	.608416	.188054	0.000000	-.040447	.980076	.596294	1.195582
14	-.417595	0.000000	1.043979	.605569	.078205	0.000000	-.016820	.984491	.596178	1.203223
15	-.417595	0.000000	1.044078	.605146	0.000000	0.000000	0.000000	.985412	.596318	1.204686

J= 12 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	1.670379	0.000000	.748722	.709182	.002651	0.000000	.894698	.669880	1.004496
2	-.417595	1.670379	.502575	.744953	.722659	.002798	-.074859	.891630	.664223	1.003075
3	-.417595	1.670379	.763256	.731597	.754872	.003209	-.121486	.883076	.646055	1.000666
4	-.417595	1.670379	.898469	.713290	.785562	.003820	-.143472	.873286	.622906	.999655
5	-.417595	1.670379	.968603	.702769	.800451	.004520	-.158476	.868924	.610653	1.000591
6	-.417595	1.670379	1.004981	.695583	.804370	.005188	-.165656	.867264	.603254	1.002794
7	-.417595	1.670379	1.023850	.691132	.802859	.005710	-.168915	.867456	.599527	1.005595
8	-.417595	1.670379	1.033637	.687265	.798045	.005945	-.169816	.869220	.597385	1.009904
9	-.417595	1.670379	1.038714	.681140	.780841	.005682	-.167178	.875749	.596507	1.021139
10	-.417595	1.670379	1.041347	.666013	7224.)	.004714	-.155225	.894764	.595925	1.052726
11	-.417595	1.670379	1.042713	.639862	.576666	.003133	-.124024	.931353	.595938	1.113474
12	-.417595	1.670379	1.043421	.617447	.363638	.001661	-.078208	.964965	.595815	1.170231
13	-.417595	1.670379	1.043788	.608169	.187802	.000778	-.040393	.979943	.595971	1.195614
14	-.417595	1.670379	1.043979	.605330	.078096	.000309	-.016797	.984346	.595855	1.203236
15	-.417595	1.670379	1.044078	.604908	0.000000	0.000000	0.000000	.985265	.595995	1.204695

J= 12 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	3.246102	0.000000	.747177	.706495	.003535	0.000000	.895165	.668846	1.005851
2	-.417595	3.246102	.502575	.743474	.719893	.003722	-.074707	.892116	.663265	1.004419
3	-.417595	3.246102	.763256	.730289	.751917	.004227	-.121236	.883602	.645285	1.001979
4	-.417595	3.246102	.898469	.712.65	.782444	.004962	-.143130	.873839	.622318	1.000919
5	-.417595	3.246102	.968603	.701752	.797284	.005832	-.158009	.869461	.610147	1.001/90
6	-.417595	3.246102	1.004981	.694665	.801208	.006706	-.165117	.867772	.602810	1.0039+1
7	-.417595	3.243102	1.023850	.690299	.799762	.007405	-.168337	.867914	.599120	1.006612
8	-.417595	3.246102	1.033637	.686505	.795056	.007687	-.169230	.869617	.596996	1.010813
9	-.417595	3.246102	1.038714	.680441	.777985	.007174	-.166600	.876093	.596130	1.021960
10	-.417595	3.246102	1.041347	.665381	.719707	.005565	-.154652	.895052	.595550	1.053465
11	-.417595	3.246102	1.042713	.639369	.573951	.003211	-.123449	.931491	.595567	1.113981
12	-.417595	3.246102	1.043421	.617165	.361526	.001424	-.077756	.964804	.595443	1.170251
13	-.417595	3.246102	1.043788	.608006	.186628	.000593	-.040141	.979596	.595600	1.195320
14	-.417595	3.246102	1.043979	.605201	.077598	.000224	-.016690	.983941	.595482	1.202844
15	-.417595	3.246102	1.044078	.604788	0.000000	0.000000	0.000000	.984847	.595624	1.204280

J= 12 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	3.577051	0.000000	.745952	.701764	.002482	0.000000	.896760	.668940	1.008305
2	-.417595	3.577051	.502575	.742409	.715127	.002580	-.074668	.893751	.663529	1.006837
3	-.417595	3.577051	.763256	.729698	.746967	.002745	-.121394	.885361	.646046	1.004299
4	-.417595	3.577051	.898469	.712176	.777193	.002720	-.143543	.875760	.623696	1.003114
5	-.417595	3.577051	.968603	.702087	.791866	.002565	-.158268	.871426	.611817	1.003863
6	-.417595	3.577051	1.004981	.695121	.795760	.002425	-.164996	.869694	.604543	1.005872
7	-.417595	3.577051	1.023850	.690852	.794341	.002279	-.167899	.869809	.600909	1.008486
8	-.417595	3.577051	1.033637	.687044	.789478	.001900	-.168496	.871537	.598785	1.012726
9	-.417595	3.577051	1.038714	.680870	.771336	.000776	-.165458	.878219	.597953	1.024182
10	-.417595	3.577051	1.041347	.665734	.710537	-.001511	-.152829	.897305	.597367	1.055893
11	-.417595	3.577051	1.042713	.640376	.563275	-.003883	-.121206	.932906	.597411	1.114971
12	-.417595	3.577051	1.043421	.619069	.354082	-.003849	-.076170	.964785	.597268	1.168786
13	-.417595	3.577051	1.043788	.610314	.182872	-.002348	-.039336	.978914	.597445	1.192677
14	-.417595	3.577051	1.043979	.607593	.076073	-.001039	-.016362	.983071	.597307	1.199886
15	-.417595	3.577051	1.044078	.607221	0.000000	0.000000	0.000000	.983939	.597469	1.201240

J= 12 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	3.672928	0.000000	.743831	.692189	.001353	0.000000	.899825	.669318	1.012904
2	-.417595	3.672928	.502575	.740384	.705910	.001479	-.073598	.895793	.663971	1.011369
3	-.417595	3.672928	.763256	.728050	.738441	.001683	-.119892	.888367	.646775	1.008620
4	-.417595	3.672928	.898469	.711326	.769044	.001213	-.142541	.878855	.625153	1.007140
5	-.417595	3.672928	.968603	.702021	.783655	-.000362	-.158137	.874663	.614031	1.007629

6	-.417595	3.672928	1.004981	.695508	.787293	-.002773	-.165359	.873010	.607185	1.009482
7	-.417595	3.672928	1.023850	.691402	.785439	-.005374	-.168221	.873259	.603773	1.012164
8	-.417595	3.672928	1.033637	.687350	.779074	-.008349	-.168021	.875457	.601745	1.017100
9	-.417595	3.672928	1.038714	.680399	.755427	-.011927	-.163241	.883245	.600959	1.030328
10	-.417595	3.672928	1.041347	.664916	.682999	-.016984	-.147524	.902985	.600409	1.063099
11	-.417595	3.672928	1.042713	.642315	.529736	-.020119	-.114233	.934856	.600472	1.115953
12	-.417595	3.672928	1.043421	.624325	.334105	-.015958	-.071941	.961568	.600331	1.160955
13	-.417595	3.672928	1.043788	.616475	.174931	-.008950	-.037642	.974104	.600510	1.182059
14	-.417595	3.672928	1.043979	.613891	.073117	-.003845	-.015725	.977976	.600370	1.188753
15	-.417595	3.672928	1.044078	.613544	0.000000	0.000000	0.000000	.978796	.600534	1.190019

J= 12 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	3.700704	0.000000	.737359	.664253	.000716	0.000000	.907213	.668942	1.024796
2	-.417595	3.700704	.502575	.733905	.679281	.000812	-.067543	.904128	.663544	1.023232
3	-.417595	3.700704	.763256	.721554	.714897	.001056	-.100032	.895399	.646079	1.020255
4	-.417595	3.700704	.898469	.704873	.748598	.001090	-.129169	.885363	.624069	1.018303
5	-.417595	3.700704	.968603	.695850	.764872	.000698	-.145288	.880881	.612961	1.018382
6	-.417595	3.700704	1.004981	.689960	.768406	-.000773	-.154990	.879375	.606734	1.020104
7	-.417595	3.700704	1.023850	.685982	.764910	-.004952	-.160502	.880079	.603718	1.023284
8	-.417595	3.700704	1.033637	.681480	.753949	-.012497	-.161834	.883509	.602094	1.029981
9	-.417595	3.700704	1.038714	.673345	.720477	-.022838	-.156752	.893131	.601385	1.046213
10	-.417595	3.700704	1.041347	.658911	.632009	-.036231	-.137446	.912288	.601117	1.077956
11	-.417595	3.700704	1.042713	.643359	.465220	-.045279	-.100946	.934294	.601086	1.114557
12	-.417595	3.700704	1.043421	.634529	.285676	-.038177	-.061637	.947326	.601106	1.136367
13	-.417595	3.700704	1.043788	.629357	.161280	-.022499	-.034764	.955158	.601135	1.149520
14	-.417595	3.700704	1.043979	.627070	.067966	-.009657	-.014015	.958666	.601151	1.155423
15	-.417595	3.700704	1.044078	.626537	0.000000	0.000000	0.000000	.959496	.601159	1.156816

J= 12 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	3.708750	0.000000	.721972	.581733	.000152	0.000000	.927036	.669294	1.056060
2	-.417595	3.708750	.502575	.718335	.598931	.000183	-.050236	.924296	.663954	1.055068
3	-.417595	3.708750	.763256	.705953	.639735	.000252	-.078062	.916144	.646755	1.053060
4	-.417595	3.708750	.898469	.689675	.678933	.000200	-.089328	.906404	.625125	1.051633
5	-.417595	3.708750	.968603	.680726	.699417	.000037	-.100183	.901903	.613949	1.051891
6	-.417595	3.708750	1.004981	.674310	.704728	-.000240	-.107223	.900289	.607074	1.053994
7	-.417595	3.708750	1.023850	.669840	.698160	-.000597	-.113856	.901766	.604039	1.058535
8	-.417595	3.708750	1.033637	.665095	.681156	-.002005	-.119975	.906397	.602840	1.067002
9	-.417595	3.708750	1.038714	.658858	.651637	-.010927	-.121695	.915064	.602897	1.081271
10	-.417595	3.708750	1.041347	.651560	.605325	-.033340	-.119245	.925120	.602771	1.098036
11	-.417595	3.708750	1.042713	.641105	.422209	-.055644	-.085843	.940695	.603084	1.123769
12	-.417595	3.708750	1.043421	.645868	.086414	-.059464	-.017876	.933506	.602921	1.111884
13	-.417595	3.708750	1.043788	.663225	-.070331	-.036669	.015216	.909491	.603196	1.071850
14	-.417595	3.708750	1.043979	.667436	-.034524	-.016911	.007406	.903419	.602975	1.062002
15	-.417595	3.708750	1.044078	.668198	0.000000	0.000000	0.000000	.902761	.603223	1.060744

J= 12 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	3.711082	0.000000	.695857	.386205	.000048	0.000000	.961326	.668945	1.111380
2	-.417595	3.711082	.502575	.691082	.402578	.000055	-.020509	.960161	.663550	1.113095
3	-.417595	3.711082	.763256	.676208	.441686	.000065	-.025226	.955457	.646087	1.117324
4	-.417595	3.711082	.898469	.657608	.479165	.000048	-.021897	.949028	.624089	1.122257
5	-.417595	3.711082	.968603	.647440	.499169	.000022	-.025254	.946798	.612995	1.126620
6	-.417595	3.711082	1.004981	.641282	.505173	-.000073	-.028264	.946203	.606784	1.130224
7	-.417595	3.711082	1.023850	.637608	.502627	-.000499	-.031344	.946851	.603719	1.133600
8	-.417595	3.711082	1.033637	.634862	.494922	-.001966	-.032544	.948468	.602146	1.137499
9	-.417595	3.711082	1.038714	.629929	.450696	-.004141	-.030109	.955184	.601698	1.149134
10	-.417595	3.711082	1.041347	.628151	.390012	-.005022	-.039710	.959846	.602928	1.156047
11	-.417595	3.711082	1.042713	.634499	.028729	-.002672	.013716	.952328	.604251	1.142389
12	-.417595	3.711082	1.043421	.998578	-1.146951	.001682	.249055	.605335	.604474	.605680
13	-.417595	3.711082	1.043788	1.621725	-1.465813	.002244	.315536	.372362	.603868	.306884
14	-.417595	3.711082	1.043979	.943353	-.613878	-.001733	.132084	.639071	.602870	.654153
15	-.417595	3.711082	1.044078	.864656	0.000000	0.000000	0.000000	.698328	.603813	.740154

J= 12 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	3.711757	0.000000	.682279	.150508	.000006	0.000000	.980966	.669293	1.143060
2	-.417595	3.711757	.502575	.676541	.158252	.000007	-.003941	.981393	.663952	1.147428

3	-.417595	3.711757	.763256	.659495	.176820	.000006	-.000530	.980679	.646753	1.158356
4	-.417595	3.711757	.898469	.638838	.194239	.000002	.005105	.978532	.625123	1.170628
5	-.417595	3.711757	.968603	.627155	.203511	.000006	.005339	.978941	.613948	1.179795
6	-.417595	3.711757	1.004981	.619995	.205726	.000005	.004939	.979170	.607081	1.185504
7	-.417595	3.711757	1.023850	.616441	.197617	.000004	.002443	.979978	.604099	1.189212
8	-.417595	3.711757	1.033637	.615278	.162142	-.000000	-.001809	.980333	.603177	1.190543
9	-.417595	3.711757	1.038714	.622732	.084757	-.000008	-.005906	.969286	.603606	1.171471
10	-.417595	3.711757	1.041347	.651408	-.050766	-.000002	.008621	.926961	.603830	1.100323
11	-.417595	3.711757	1.042713	.717912	-.395391	-.000024	.075793	.841239	.603936	.960485
12	-.417595	3.711757	1.043421	1.018513	-1.070558	-.000020	.226017	.593074	.604054	.588738
13	-.417595	3.711757	1.043788	.910819	-.661142	-.000024	.142549	.661407	.602422	.686587
14	-.417595	3.711757	1.043979	.849650	-.255487	-.000015	.054858	.710816	.603945	.758685
15	-.417595	3.711757	1.044078	.837327	0.000000	0.000000	0.000000	.719486	.602445	.772439

J= 12 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.417595	3.711952	0.000000	.679640	0.000000	0.000000	0.000000	.984264	.668945	1.148683
2	-.417595	3.711952	.502575	.673642	0.000000	0.000000	0.000000	.985017	.663549	1.153644
3	-.417595	3.711952	.763256	.655829	0.000000	0.000000	0.000000	.985146	.646087	1.166231
4	-.417595	3.711952	.898469	.634291	0.000000	0.000000	0.000000	.983914	.624088	1.180433
5	-.417595	3.711952	.968603	.622398	0.000000	0.000000	0.000000	.984891	.612994	1.190586
6	-.417595	3.711952	1.004981	.615834	0.000000	0.000000	0.000000	.985290	.606775	1.196131
7	-.417595	3.711952	1.023850	.612537	0.000000	0.000000	0.000000	.985644	.603744	1.199132
8	-.417595	3.711952	1.033637	.612076	0.000000	0.000000	0.000000	.983869	.602203	1.197334
9	-.417595	3.711952	1.038714	.620914	0.000000	0.000000	0.000000	.969542	.602002	1.173152
10	-.417595	3.711952	1.041347	.650075	0.000000	0.000000	0.000000	.927497	.602942	1.101862
11	-.417595	3.711952	1.042713	.699380	0.000000	0.000000	0.000000	.862633	.603308	.995270
12	-.417595	3.711952	1.043421	.785994	0.000000	0.000000	0.000000	.769672	.604957	.847497
13	-.417595	3.711952	1.043788	.822110	0.000000	0.000000	0.000000	.733559	.603066	.793346
14	-.417595	3.711952	1.043979	.834048	0.000000	0.000000	0.000000	.726125	.605623	.780791
15	-.417595	3.711952	1.044078	.835680	0.000000	0.000000	0.000000	.722806	.604034	.776614

J= 13 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	0.000000	0.000000	.705175	.784415	0.000000	0.000000	.873023	.615634	1.003938
2	-.185598	0.000000	.485511	.696703	.802637	0.000000	-.055596	.867951	.604704	1.002943
3	-.185598	0.000000	.737342	.672440	.847223	0.000000	-.080800	.854132	.574352	1.001068
4	-.185598	0.000000	.867964	.645832	.892210	0.000000	-.086370	.839305	.542050	.999705
5	-.185598	0.000000	.935717	.631720	.917948	0.000000	-.093615	.832430	.525863	1.000318
6	-.185598	0.000000	.970860	.622110	.928595	0.000000	-.096344	.829035	.515751	1.002365
7	-.185598	0.000000	.989088	.616869	.930977	0.000000	-.097765	.828376	.510999	1.004964
8	-.185598	0.000000	.998543	.612281	.928702	0.000000	-.098091	.829577	.507935	1.009430
9	-.185598	0.000000	1.003447	.605135	.910421	0.000000	-.096482	.837742	.506947	1.024163
10	-.185598	0.000000	1.005991	.585471	.836497	0.000000	-.088819	.864176	.505950	1.070533
11	-.185598	0.000000	1.007310	.553058	.645274	0.000000	-.068366	.915174	.506144	1.159833
12	-.185598	0.000000	1.007995	.528841	.389465	0.000000	-.041171	.956333	.505748	1.233898
13	-.185598	0.000000	1.008350	.520282	.197063	0.000000	-.020814	.972800	.506131	1.263363
14	-.185598	0.000000	1.008534	.517439	.081333	0.000000	-.008583	.977432	.505762	1.272163
15	-.185598	0.000000	1.008629	.517323	0.000000	0.000000	0.000000	.978384	.506141	1.273516

J= 13 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	1.670379	0.000000	.704603	.783504	.002644	0.000000	.873117	.615202	1.004372
2	-.185598	1.670379	.485511	.696162	.801688	.002762	-.055540	.868055	.604306	1.003375
3	-.185598	1.670379	.737342	.671976	.846190	.003112	-.080711	.854259	.574041	1.001493
4	-.185598	1.670379	.867964	.645455	.891105	.003671	-.086266	.839456	.541831	1.000118
5	-.185598	1.670379	.935717	.631409	.916812	.004343	-.093509	.832592	.525706	1.000710
6	-.185598	1.670379	.970860	.621848	.927456	.005006	-.096238	.829193	.515632	1.002725
7	-.185598	1.670379	.989088	.616639	.929857	.005531	-.097656	.828517	.510896	1.005284
8	-.185598	1.670379	.998543	.612083	.927625	.005759	-.097984	.829694	.507841	1.009703
9	-.185598	1.670379	1.003447	.604964	.909449	.005460	-.096384	.837827	.506855	1.024383
10	-.185598	1.670379	1.005991	.585332	.835648	.004434	-.088734	.864231	.505862	1.070702
11	-.185598	1.670379	1.007310	.552955	.644411	.002816	-.068276	.915183	.506055	1.159931
12	-.185598	1.670379	1.007995	.528805	.388786	.001433	-.041100	.956233	.505661	1.233801
13	-.185598	1.670379	1.008350	.520279	.196687	.000660	-.020775	.972636	.506042	1.263152
14	-.185598	1.670379	1.008534	.517448	.081173	.000261	-.008567	.977247	.505674	1.271915
15	-.185598	1.670379	1.008629	.517332	0.000000	0.000000	0.000000	.978195	.506052	1.273261

J= 13 K= 3

L	X	Y	Z	R/RREF	U/APEF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	3.246102	0.000000	.703355	.780904	.003550	0.000000	.873652	.614487	1.005701
2	-.185598	3.246102	.485511	.695040	.798963	.003652	-.055550	.868631	.603733	1.004688
3	-.185598	3.246102	.737342	.671162	.843161	.003941	-.080789	.854935	.573800	1.002771
4	-.185598	3.246102	.867964	.644908	.887796	.004415	-.086329	.840205	.541855	1.001351
5	-.185598	3.246102	.935717	.630982	.913387	.005074	-.093426	.833339	.525822	1.001878
6	-.185598	3.246102	.970860	.621535	.923995	.005804	-.096068	.829925	.515827	1.003812
7	-.185598	3.246102	.989088	.616403	.926422	.006401	-.097424	.829213	.511129	1.006280
8	-.185598	3.246102	.998543	.611907	.924230	.006597	-.097717	.830360	.508103	1.010630
9	-.185598	3.246102	1.003447	.604805	.906968	.005962	-.096083	.838490	.507123	1.025302
10	-.185598	3.246102	1.005991	.585178	.831505	.004227	-.088337	.864936	.506142	1.071689
11	-.185598	3.246102	1.007310	.552973	.639160	.001921	-.067736	.915657	.506333	1.160516
12	-.185598	3.246102	1.007995	.529227	.384743	.000572	-.040678	.956007	.505945	1.233117
13	-.185598	3.246102	1.008350	.520886	.194549	.000159	-.020550	.972036	.506320	1.261785
14	-.185598	3.246102	1.008534	.518113	.080289	.000045	-.008474	.976539	.505958	1.270339
15	-.185598	3.246102	1.008629	.518004	0.000000	0.000000	0.000000	.977464	.506330	1.271650

J= 13 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	3.577800	0.000000	.702327	.776562	.002582	0.000000	.875251	.614712	1.008130
2	-.185598	3.577800	.485511	.694268	.794520	.002533	-.055635	.870305	.604225	1.007073
3	-.185598	3.577800	.737342	.671133	.838357	.002241	-.081411	.856850	.575060	1.005036
4	-.185598	3.577800	.867964	.645734	.882478	.001525	-.087600	.842425	.543983	1.003482
5	-.185598	3.577800	.935717	.632206	.907758	.000662	-.094668	.835646	.528300	1.003874
6	-.185598	3.577800	.970860	.622907	.918222	-.000162	-.096915	.832220	.518396	1.005701
7	-.185598	3.577800	.989088	.617826	.920526	-.000901	-.097895	.831527	.513739	1.008161
8	-.185598	3.577800	.998543	.613226	.917747	-.001938	-.097790	.832856	.510729	1.012795
9	-.185598	3.577800	1.003447	.605764	.896977	-.003978	-.095636	.841533	.509770	1.028371
10	-.185598	3.577800	1.005991	.585826	.816895	-.007546	-.087044	.868536	.508812	1.075673
11	-.185598	3.577800	1.007310	.554502	.620683	-.009981	-.065865	.917968	.509016	1.162161
12	-.185598	3.577800	1.007995	.532088	.371929	-.007755	-.039346	.955909	.508628	1.230334
13	-.185598	3.577800	1.008350	.524266	.188207	-.004316	-.019885	.970891	.509005	1.257042
14	-.185598	3.577800	1.008534	.521623	.077739	-.001847	-.008204	.975112	.508641	1.265062
15	-.185598	3.577800	1.008629	.521541	0.000000	0.000000	0.000000	.975981	.509014	1.266268

J= 13 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	3.673359	0.000000	.700204	.767651	.001521	0.000000	.878374	.615040	1.012954
2	-.185598	3.673359	.485511	.692272	.785920	.001568	-.054147	.873403	.604632	1.011821
3	-.185598	3.673359	.737342	.669665	.830323	.001473	-.079473	.859925	.575861	1.009526
4	-.185598	3.673359	.867964	.645300	.874657	.000380	-.086697	.845667	.545709	1.007615
5	-.185598	3.673359	.935717	.632719	.899762	-.002092	-.095366	.839113	.530922	1.007711
6	-.185598	3.673359	.970860	.623898	.909803	-.005945	-.098843	.835839	.521478	1.009433
7	-.185598	3.673359	.989088	.618985	.911168	-.009923	-.100215	.835520	.517174	1.012243
8	-.185598	3.673359	.998543	.613761	.905364	-.015681	-.099419	.837803	.514210	1.018456
9	-.185598	3.673359	1.003447	.605114	.875860	-.023399	-.095438	.848495	.513436	1.037325
10	-.185598	3.673359	1.005991	.585268	.784355	-.034807	-.084678	.875548	.512430	1.084771
11	-.185598	3.673359	1.007310	.558419	.596743	-.039668	-.063765	.918248	.512767	1.159246
12	-.185598	3.673359	1.007995	.538130	.367011	-.028458	-.038949	.951949	.512273	1.219716
13	-.185598	3.673359	1.008350	.530367	.188961	-.015023	-.019990	.966805	.512761	1.245972
14	-.185598	3.673359	1.008534	.527483	.078307	-.006302	-.008263	.971191	.512286	1.254358
15	-.185598	3.673359	1.008629	.527484	0.000000	0.000000	0.000000	.972105	.512770	1.255537

J= 13 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	3.700889	0.000000	.693303	.739537	.000842	0.000000	.886676	.614735	1.026587
2	-.185598	3.700889	.485511	.685373	.759008	.000898	-.046440	.881649	.604258	1.025475
3	-.185598	3.700889	.737342	.662747	.806236	.001014	-.065447	.867793	.575128	1.023003
4	-.185598	3.700889	.867964	.638353	.853389	.000846	-.069217	.852886	.544442	1.020626
5	-.185598	3.700889	.935717	.625862	.879966	.000316	-.078635	.845982	.529468	1.020399
6	-.185598	3.700889	.970860	.617777	.889748	-.001227	-.085208	.843167	.520889	1.022306
7	-.185598	3.700889	.989088	.612435	.888363	-.006939	-.091050	.843609	.516656	1.026401
8	-.185598	3.700889	.998543	.606717	.875667	-.019491	-.092637	.848211	.514624	1.035879
9	-.185598	3.700889	1.003447	.596912	.837431	-.040459	-.090987	.860163	.513441	1.057344
10	-.185598	3.700889	1.005991	.582727	.759260	-.065979	-.082797	.880785	.513257	1.093160
11	-.185598	3.700889	1.007310	.569955	.661425	-.084755	-.071692	.900056	.512992	1.127024
12	-.185598	3.700889	1.007995	.554158	.499109	-.067063	-.053029	.926102	.513207	1.172750

13	-.185598	3.700889	1.008350	.539813	.274027	-.038793	-.029095	.950321	.512995	1.216110
14	-.185598	3.700889	1.008534	.534929	.111205	-.016369	-.011735	.959428	.513226	1.232237
15	-.185598	3.700889	1.008629	.533628	0.000000	0.000000	0.000000	.961351	.513003	1.235910

J= 13 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	3.708820	0.000000	.675635	.651236	.000152	0.000000	.910288	.615023	1.064863
2	-.185598	3.708820	.485511	.667529	.672167	.000155	-.027019	.905762	.604622	1.064698
3	-.185598	3.708820	.737342	.644939	.722731	.000133	-.029968	.892883	.575854	1.064111
4	-.185598	3.708820	.867964	.620934	.773081	-.000054	-.022524	.878829	.545695	1.063375
5	-.185598	3.708820	.935717	.608421	.802061	-.000309	-.024172	.872483	.530837	1.064327
6	-.185598	3.708820	.970860	.599275	.812519	-.000732	-.025888	.869764	.521227	1.067458
7	-.185598	3.708820	.989088	.593331	.806829	-.000958	-.030378	.871863	.517304	1.074309
8	-.185598	3.708820	.998543	.586231	.782481	-.004394	-.039184	.878968	.515279	1.088292
9	-.185598	3.708820	1.003447	.580687	.750603	-.011153	-.046055	.889072	.516273	1.104994
10	-.185598	3.708820	1.005991	.573174	.717272	-.040469	-.056298	.899614	.515635	1.123936
11	-.185598	3.708820	1.007310	.584369	.766823	-.082441	-.070478	.884545	.516901	1.096592
12	-.185598	3.708820	1.007995	.582243	.687921	-.096145	-.071682	.885940	.515832	1.099924
13	-.185598	3.708820	1.008350	.564245	.120532	-.060114	-.012555	.916382	.517064	1.152098
14	-.185598	3.708820	1.008534	.567962	.032359	-.030360	-.003445	.908290	.515874	1.138929
15	-.185598	3.708820	1.008629	.569840	0.000000	0.000000	0.000000	.907415	.517082	1.136331

J= 13 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	3.711105	0.000000	.644976	.432314	.000041	0.000000	.953125	.614742	1.135880
2	-.185598	3.711105	.485511	.635604	.449887	.000042	.000370	.950698	.604267	1.139641
3	-.185598	3.711105	.737342	.610078	.491879	.000031	.019123	.942737	.575143	1.148779
4	-.185598	3.711105	.867964	.582911	.531770	-.000006	.040985	.934058	.544472	1.159133
5	-.185598	3.711105	.935717	.568255	.552932	-.000037	.047164	.931826	.529514	1.168201
6	-.185598	3.711105	.970860	.559269	.559422	-.000193	.050272	.931533	.520978	1.175303
7	-.185598	3.711105	.989088	.554566	.562098	-.001139	.046010	.931659	.516666	1.179439
8	-.185598	3.711105	.998543	.549679	.528113	-.003973	.050797	.937189	.515153	1.190649
9	-.185598	3.711105	1.003447	.551621	.538433	-.006502	.032901	.932313	.514283	1.182785
10	-.185598	3.711105	1.005991	.541921	.356388	-.003432	.045415	.952880	.516385	1.217486
11	-.185598	3.711105	1.007310	.555597	.397937	.005774	-.004865	.930822	.517163	1.177505
12	-.185598	3.711105	1.007995	1.072796	-1.344073	.016787	.153712	.485445	.520784	.471990
13	-.185598	3.711105	1.008350	2.415520	-1.717208	.003013	.181685	.214217	.517445	.150539
14	-.185598	3.711105	1.008534	.937149	-.790526	-.003770	.083535	.554903	.520027	.569500
15	-.185598	3.711105	1.008629	.797797	0.000000	0.000000	0.000000	.648504	.517374	.709832

J= 13 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	3.711763	0.000000	.629163	.166998	.000003	0.000000	.977522	.615021	1.176580
2	-.185598	3.711763	.485511	.618908	.174447	.000003	.005198	.976915	.604621	1.183604
3	-.185598	3.711763	.737342	.591423	.191904	-.000000	.019044	.973673	.575852	1.201306
4	-.185598	3.711763	.867964	.562436	.207432	-.000003	.032364	.970231	.545693	1.221366
5	-.185598	3.711763	.935717	.546553	.215264	.000005	.036442	.971240	.530834	1.236727
6	-.185598	3.711763	.970860	.536281	.216012	.000005	.038443	.971945	.521236	1.247052
7	-.185598	3.711763	.989088	.531919	.197481	.000003	.033431	.972738	.517418	1.252154
8	-.185598	3.711763	.998543	.534360	.109672	.000001	.015456	.965260	.515796	1.240254
9	-.185598	3.711763	1.003447	.553519	-.022946	.000014	-.008327	.934295	.517150	1.183672
10	-.185598	3.711763	1.005991	.571404	-.135393	.000013	-.014674	.904055	.516580	1.130883
11	-.185598	3.711763	1.007310	.630174	-.535556	-.000055	.031817	.823563	.518987	.990632
12	-.185598	3.711763	1.007995	1.562831	-1.573400	.000015	.161495	.331834	.518601	.277560
13	-.185598	3.711763	1.008350	.897698	-.833452	-.000010	.089250	.578414	.519241	.603930
14	-.185598	3.711763	1.008534	.784404	-.318416	.000008	.033552	.660996	.518488	.728422
15	-.185598	3.711763	1.008629	.769878	0.000000	0.000000	0.000000	.674477	.519265	.748856

J= 13 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.185598	3.711952	0.000000	.626295	0.000000	0.000000	0.000000	.981553	.614742	1.183592
2	-.185598	3.711952	.485511	.615790	0.000000	0.000000	0.000000	.981287	.604267	1.191305
3	-.185598	3.711952	.737342	.587512	0.000000	0.000000	0.000000	.978944	.575142	1.211020
4	-.185598	3.711952	.867964	.557588	0.000000	0.000000	0.000000	.976475	.544471	1.233491
5	-.185598	3.711952	.935717	.541395	0.000000	0.000000	0.000000	.978050	.529512	1.250130
6	-.185598	3.711952	.970860	.532198	0.000000	0.000000	0.000000	.978879	.520957	1.259795
7	-.185598	3.711952	.989088	.528146	0.000000	0.000000	0.000000	.978343	.516708	1.262960
8	-.185598	3.711952	.998543	.532830	0.000000	0.000000	0.000000	.966762	.515119	1.243610
9	-.185598	3.711952	1.003447	.550432	0.000000	0.000000	0.000000	.935385	.514866	1.187706

10	-.185598	3.711952	1.005991	.569917	0.000000	0.000000	0.000000	.907572	.517240	1.136466
11	-.185598	3.711952	1.007310	.602324	0.000000	0.000000	0.000000	.858296	.516972	1.051248
12	-.185598	3.711952	1.007995	.726221	0.000000	0.000000	0.000000	.711013	.516353	.808072
13	-.185598	3.711952	1.008350	.754078	0.000000	0.000000	0.000000	.684417	.516104	.766221
14	-.185598	3.711952	1.008534	.767361	0.000000	0.000000	0.000000	.679517	.521435	.755440
15	-.185598	3.711952	1.008629	.768615	0.000000	0.000000	0.000000	.676997	.520350	.752148

J= 14 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	0.000000	0.000000	.662392	.851866	0.000000	0.000000	.851001	.563697	1.003423
2	0.000000	0.000000	.481357	.651044	.872249	0.000000	-.037138	.844692	.549932	1.002892
3	0.000000	0.000000	.731034	.620720	.922275	0.000000	-.041687	.827562	.513684	1.001481
4	0.000000	0.000000	.860538	.590859	.972173	0.000000	-.030381	.809878	.478524	.999600
5	0.000000	0.000000	.927712	.575966	.999798	0.000000	-.028065	.801987	.461918	1.000020
6	0.000000	0.000000	.962554	.565407	1.011025	0.000000	-.024563	.797723	.45 38	1.002092
7	0.000000	0.000000	.980626	.560081	1.013392	0.000000	-.023036	.796819	.44t ?	1.004752
8	0.000000	0.000000	.990000	.554968	1.010850	0.000000	-.021884	.797996	.442b.	1.009936
9	0.000000	0.000000	.994862	.546288	.986350	0.000000	-.020912	.809127	.442016	1.030500
10	0.000000	0.000000	.997384	.520864	.882491	0.000000	-.018305	.846238	.440775	1.098507
11	0.000000	0.000000	.998692	.484400	.628300	0.000000	-.012525	.910745	.441165	1.217069
12	0.000000	0.000000	.999371	.463683	.352227	0.000000	-.006837	.950090	.440540	1.292040
13	0.000000	0.000000	.999723	.457953	.172656	0.000000	-.003309	.963250	.441123	1.316469
14	0.000000	0.000000	.999905	.455713	.070411	0.000000	-.001334	.966696	.440535	1.323773
15	0.000000	0.000000	1.000000	.455995	0.000000	0.000000	0.000000	.967385	.441123	1.324389

J= 14 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	1.670379	0.000000	.661974	.850877	.002598	0.000000	.851147	.563437	1.003849
2	0.000000	1.670379	.481357	.650671	.871205	.002693	-.037120	.844853	.549722	1.003314
3	0.000000	1.670379	.731034	.620454	.921099	.002994	-.041680	.827761	.513587	1.001893
4	0.000000	1.670379	.860538	.590698	.970880	.003514	-.030375	.810113	.478532	.999998
5	0.000000	1.670379	.927712	.575879	.998458	.004174	-.028059	.802238	.461992	1.000393
6	0.000000	1.670379	.962554	.565372	1.009668	.004840	-.024554	.797975	.451153	1.002433
7	0.000000	1.670379	.980626	.560076	1.012042	.005362	-.023023	.797058	.446413	1.005058
8	0.000000	1.670379	.990000	.554998	1.009564	.005559	-.021870	.798207	.443003	1.010180
9	0.000000	1.670379	.994862	.546357	.985220	.005210	-.020907	.809284	.442158	1.030648
10	0.000000	1.670379	.997384	.520949	.881290	.004132	-.018294	.846381	.440922	1.098621
11	0.000000	1.670379	.998692	.484522	.626645	.002475	-.012497	.910813	.441309	1.217037
12	0.000000	1.670379	.999371	.463917	.350986	.001204	-.006815	.949928	.440688	1.291560
13	0.000000	1.670379	.999723	.458231	.172000	.000544	-.003297	.962982	.441268	1.315783
14	0.000000	1.670379	.999905	.456007	.070137	.000213	-.001328	.966397	.440683	1.323022
15	0.000000	1.670379	1.000000	.456288	0.000000	0.000000	0.000000	.967080	.441268	1.323631

J= 14 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	3.246102	0.000000	.661115	.848146	.003489	0.000000	.851804	.563140	1.005145
2	0.000000	3.246102	.481357	.649996	.868297	.003516	-.037290	.845574	.549620	1.004587
3	0.000000	3.246102	.731034	.620206	.917745	.003603	-.042080	.828644	.513930	1.003121
4	0.000000	3.246102	.860538	.590791	.967100	.003828	-.030860	.811121	.479203	1.001180
5	0.000000	3.246102	.927712	.576101	.994507	.004286	-.028387	.803251	.462753	1.001502
6	0.000000	3.246102	.962554	.565716	1.005646	.004872	-.024771	.798989	.452001	1.003464
7	0.000000	3.246102	.980626	.560486	1.005031	.005360	-.023170	.798042	.447292	1.006005
8	0.000000	3.246102	.990000	.555479	1.005602	.005465	-.021964	.799163	.443918	1.011040
9	0.000000	3.246102	.994862	.546782	.980755	.004707	-.020964	.810328	.443073	1.031657
10	0.000000	3.246102	.997384	.521158	.874212	.002726	-.018224	.847839	.441858	1.100337
11	0.000000	3.246102	.998692	.485041	.617011	.000376	-.012333	.911751	.442237	1.217769
12	0.000000	3.246102	.999371	.465068	.344438	-.000421	-.006697	.949602	.441630	1.289838
13	0.000000	3.246102	.999723	.459598	.168716	-.000342	-.003236	.962138	.442196	1.313065
14	0.000000	3.246102	.999905	.457446	.068800	-.000161	-.001304	.965415	.441625	1.320013
15	0.000000	3.246102	1.000000	.457726	0.000000	0.000000	0.000000	.966071	.442196	1.320586

J= 14 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	3.577985	0.000000	.660435	.843872	.002579	0.000000	.853494	.563677	1.007555
2	0.000000	3.577985	.481357	.649659	.863849	.002376	-.037521	.847375	.550505	1.006935
3	0.000000	3.577985	.731034	.620856	.912746	.001601	-.043228	.830806	.515811	1.005317
4	0.000000	3.577985	.860538	.592528	.961414	.000132	-.033133	.813748	.482169	1.003243
5	0.000000	3.577985	.927712	.578307	.988472	-.001506	-.030802	.806020	.466128	1.003420
6	0.000000	3.577985	.962554	.568082	.999416	-.003032	-.026813	.801778	.455476	1.005286

7	0.000000	3.577985	.980626	562872	1.001516	-.004455	-.024825	.800920	.450815	1.007918
8	0.000000	3.577985	.990000	557545	997577	-.006295	-.023130	.802535	.447450	1.013800
9	0.000000	3.577985	.994862	547760	966501	-.009978	-.021566	.815382	.446634	1.037349
10	0.000000	3.577985	.997384	520991	847306	-.015683	-.018054	.854982	.445438	1.109750
11	0.000000	3.577985	.998692	486626	586624	-.017678	-.011847	.916175	.445835	1.222082
12	0.000000	3.577985	.999371	468473	326248	-.012197	-.006373	.950373	.445224	1.287123
13	0.000000	3.577985	.999723	463561	160131	-.006497	-.003078	.961679	.445797	1.307939
14	0.000000	3.577985	.999905	461534	.065387	-.002738	-.001238	.964651	.445220	1.314283
15	0.000000	3.577985	1.000000	461847	0.000000	0.000000	0.000000	.965248	.445797	1.314740

J= 14 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	3.673465	0.000000	658369	835271	.001660	0.000000	.856707	.564029	1.012616
2	0.000000	3.673465	.481357	647759	855483	.001587	-.035754	.850562	.550959	1.011906
3	0.000000	3.673465	.731034	619635	904781	.001081	-.041093	.833996	.516773	1.009972
4	0.000000	3.673465	.860538	592542	953594	-.000783	-.032658	.817204	.484227	1.007495
5	0.000000	3.673465	.927712	579410	980589	-.004329	-.032685	.809799	.469206	1.007355
6	0.000000	3.673465	.962554	569662	991144	-.009377	-.030780	.805801	.459034	1.009208
7	0.000000	3.673465	.980626	564450	991451	-.015449	-.029790	.805709	.454783	1.012809
8	0.000000	3.673465	.990000	557568	980180	-.025024	-.027617	.809741	.451485	1.022886
9	0.000000	3.673465	.994862	544550	929439	-.041078	-.023936	.828012	.450894	1.055897
10	0.000000	3.673465	.997384	517293	790687	-.059565	-.018512	.869234	.449649	1.131467
11	0.000000	3.673465	.998692	488512	551166	-.061774	-.011806	.921514	.450171	1.227303
12	0.000000	3.673465	.999371	472196	315978	-.040016	-.006349	.951813	.449442	1.284998
13	0.000000	3.673465	.999723	467544	157233	-.020447	-.003058	.962756	.450131	1.304930
14	0.000000	3.673465	.999905	465389	.064414	-.008427	-.001219	.965722	.449437	1.311370
15	0.000000	3.673465	1.000000	465818	0.000000	0.000000	0.000000	.966322	.450130	1.311703

J= 14 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	3.700934	0.000000	651239	807239	.000969	0.000000	.865718	.563789	1.027733
2	0.000000	3.700934	.481357	640637	828422	.000934	-.026837	.859521	.550641	1.027097
3	0.000000	3.700934	.731034	612470	879923	.000775	-.024594	.842532	.516025	1.025068
4	0.000000	3.700934	.860538	585185	930807	.000204	-.011830	.825010	.482784	1.022214
5	0.000000	3.700934	.927712	571992	958867	-.000571	-.012638	.817322	.467501	1.021968
6	0.000000	3.700934	.962554	562669	969192	-.001994	-.015231	.813871	.457940	1.024365
7	0.000000	3.700934	.980626	557150	965822	-.009113	-.019454	.815277	.454232	1.030188
8	0.000000	3.700934	.990000	548384	942803	-.031126	-.021443	.823067	.451357	1.046649
9	0.000000	3.700934	.994862	533318	872042	-.068434	-.019882	.845813	.451088	1.087627
10	0.000000	3.700934	.997384	511883	752669	-.103241	-.018798	.878834	.449860	1.148785
11	0.000000	3.700934	.998692	493084	612301	-.118607	-.015467	.913607	.450485	1.212247
12	0.000000	3.700934	.999371	476117	440743	-.089301	-.009526	.944413	.449651	1.270798
13	0.000000	3.700934	.999723	467196	228276	-.048906	-.004624	.964059	.450404	1.307086
14	0.000000	3.700934	.999905	463408	092729	-.020678	-.001754	.970277	.449634	1.319806
15	0.000000	3.700934	1.000000	463574	0.000000	0.000000	0.000000	.971580	.450399	1.321390

J= 14 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	3.708837	0.000000	632092	.716257	.000026	0.000000	.892333	.564037	1.072049
2	0.000000	3.708837	.481357	621298	737734	-.000027	-.005937	.886824	.550982	1.072798
3	0.000000	3.708837	.731034	593115	789220	-.000225	.014293	.871366	.516820	1.073853
4	0.000000	3.708837	.860538	565989	838563	-.000653	.040138	.855644	.484285	1.074410
5	0.000000	3.708837	.927712	552362	864885	-.001064	.048753	.849423	.469189	1.077047
6	0.000000	3.708837	.962554	542154	874572	-.001483	.053907	.846268	.458808	1.081082
7	0.000000	3.708837	.980626	536329	871024	-.003499	.052549	.847722	.454658	1.087630
8	0.000000	3.708837	.990000	526870	832492	-.013332	.041325	.859635	.452916	1.110792
9	0.000000	3.708837	.994862	512409	732386	-.024908	.025447	.887289	.454655	1.159361
10	0.000000	3.708837	.997384	496983	620594	-.033904	.007916	.914381	.454432	1.209458
11	0.000000	3.708837	.998692	492544	596760	-.083892	-.002438	.924957	.455582	1.227844
12	0.000000	3.708837	.999371	495510	645517	-.116417	-.010320	.916961	.454363	1.214311
13	0.000000	3.708837	.999723	480332	262070	-.079196	-.004783	.948149	.455426	1.271335
14	0.000000	3.708837	.999905	478697	.091925	-.036744	-.001775	.949160	.454360	1.274427
15	0.000000	3.708837	1.000000	479673	0.000000	0.000000	0.000000	.949453	.455427	1.273782

J= 14 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	3.711110	0.000000	597336	477793	.000008	0.000000	.943872	.563808	1.159913
2	0.000000	3.711110	.481357	585247	492589	.000001	.018825	.940905	.550662	1.165762
3	0.000000	3.711110	.731034	553885	525645	-.000038	.058130	.931701	.516055	1.180073

4	0.000000	3.711110	.860538	.522919	.550838	-.000107	.095620	.923337	.482831	1.196704
5	0.000000	3.711110	.927712	.506661	.558534	-.000154	.109737	.922853	.467573	1.211283
6	0.000000	3.711110	.962554	.496572	.561420	-.000397	.116790	.922439	.458058	1.220520
7	0.000000	3.711110	.980626	.493309	.571450	-.001844	.115997	.921496	.454582	1.222492
8	0.000000	3.711110	.990000	.481647	.445758	-.004932	.110726	.939857	.452680	1.258838
9	0.000000	3.711110	.994862	.475640	.213568	-.006107	.092220	.955019	.454245	1.285584
10	0.000000	3.711110	.997384	.474946	.050047	-.001221	.082998	.955008	.453577	1.286321
11	0.000000	3.711110	.998692	.484867	-.006457	.011324	.056515	.941276	.456394	1.257384
12	0.000000	3.711110	.999371	.789966	-1.163116	.023582	.040990	.578392	.456910	.635593
13	0.000000	3.711110	.999723	1.223346	-1.476152	.006854	.029723	.374243	.457828	.345250
14	0.000000	3.711110	.999905	.734585	-.723916	-.003348	.013777	.621143	.456282	.702707
15	0.000000	3.711110	1.000000	.653235	0.000000	0.000000	0.000000	.700813	.457796	.830948

J= 14 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	3.711764	0.000000	.579262	.183424	.000001	0.000000	.973713	.564035	1.211381
2	0.000000	3.711764	.481357	.566644	.188634	.000001	.012672	.972355	.550980	1.220396
3	0.000000	3.711764	.731034	.534343	.199225	-.000005	.034393	.967201	.516817	1.242764
4	0.000000	3.711764	.860538	.503011	.204870	-.000009	.052538	.962766	.484281	1.267330
5	0.000000	3.711764	.927712	.486732	.204754	-.000002	.058707	.963950	.469185	1.285697
6	0.000000	3.711764	.962554	.475888	.200945	-.000008	.061926	.964133	.458819	1.297583
7	0.000000	3.711764	.980626	.471998	.168801	-.000008	.051655	.963488	.454764	1.300980
8	0.000000	3.711764	.990000	.475665	.057139	-.000014	.014479	.952926	.453274	1.282740
9	0.000000	3.711764	.994862	.488365	-.039433	-.000009	-.020858	.932432	.455367	1.241993
10	0.000000	3.711764	.997384	.493322	-.107678	-.000013	-.031830	.922118	.454901	1.223303
11	0.000000	3.711764	.998692	.522725	-.345777	-.000006	-.019624	.876687	.458266	1.136410
12	0.000000	3.711764	.999371	.834768	-1.193459	.000064	.017017	.548581	.457938	.589677
13	0.000000	3.711764	.999723	.682430	-.749603	.000047	.015664	.671885	.458515	.782838
14	0.000000	3.711764	.999905	.616750	-.294543	.000053	.005541	.742344	.457840	.900661
15	0.000000	3.711764	1.000000	.608197	0.000000	0.000000	0.000000	.753936	.458542	.919849

J= 14 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	3.711952	0.000000	.576139	0.000000	0.000000	0.000000	.978598	.563808	1.220094
2	0.000000	3.711952	.481357	.563339	0.000000	0.000000	0.000000	.977497	.550662	1.229723
3	0.000000	3.711952	.731034	.530390	0.000000	0.000000	0.000000	.972972	.516055	1.253898
4	0.000000	3.711952	.860538	.498249	0.000000	0.000000	0.000000	.969053	.482829	1.280469
5	0.000000	3.711952	.927712	.481842	0.000000	0.000000	0.000000	.970375	.467567	1.299505
6	0.000000	3.711952	.962554	.472027	0.000000	0.000000	0.000000	.970385	.458048	1.310260
7	0.000000	3.711952	.980626	.469707	0.000000	0.000000	0.000000	.967735	.454552	1.309260
8	0.000000	3.711952	.990000	.474972	0.000000	0.000000	0.000000	.953018	.452657	1.283613
9	0.000000	3.711952	.994862	.487430	0.000000	0.000000	0.000000	.932249	.454407	1.242702
10	0.000000	3.711952	.997384	.492859	0.000000	0.000000	0.000000	.923421	.455116	1.225492
11	0.000000	3.711952	.998692	.513611	0.000000	0.000000	0.000000	.891676	.457974	1.164002
12	0.000000	3.711952	.999371	.584593	0.000000	0.000000	0.000000	.773433	.452144	.958696
13	0.000000	3.711952	.999723	.598250	0.000000	0.000000	0.000000	.760543	.454995	.934051
14	0.000000	3.711952	.999905	.600339	0.000000	0.000000	0.000000	.757744	.454904	.929317
15	0.000000	3.711952	1.000000	.604258	0.000000	0.000000	0.000000	.755840	.456723	.924572

J= 15 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.139198	0.000000	0.000000	.624677	9.0964	0.000000	0.000000	.830897	.519042	1.002963
2	.139198	0.000000	.482562	.612779	.929665	0.000000	-.018914	.824510	.505243	1.002938
3	.139198	0.000000	.732863	.583192	.977655	0.000000	-.004867	.807437	.470891	1.001806
4	.139198	0.000000	.862692	.560187	1.009302	0.000000	.014771	.792564	.443984	.999312
5	.139198	0.000000	.930033	.553732	1.026583	0.000000	.015390	.789050	.436923	.999504
6	.139198	0.000000	.964962	.547555	1.031157	0.000000	.018039	.787140	.431002	1.001568
7	.139198	0.000000	.983080	.545540	1.029397	0.000000	.017698	.787940	.429853	1.004067
8	.139198	0.000000	.992477	.541433	1.024582	0.000000	.018053	.790092	.427782	1.009857
9	.139198	0.000000	.997351	.530847	.986552	0.000000	.017172	.806656	.428211	1.039203
10	.139198	0.000000	.999880	.497576	.833967	0.000000	.015104	.858205	.427023	1.134612
11	.139198	0.000000	1.001191	.461704	.525334	0.000000	.009922	.926806	.427910	1.262535
12	.139198	0.000000	1.001871	.446574	.265886	0.000000	.005142	.956062	.426952	1.319862
13	.139198	0.000000	1.002224	.443915	.122848	0.000000	.002402	.963922	.427899	1.333897
14	.139198	0.000000	1.002407	.442102	.048640	0.000000	.000962	.965728	.426950	1.338584
15	.139198	0.000000	1.002502	.442928	0.000000	0.000000	0.000000	.966069	.427899	1.338059

J= 15 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT

1	.139198	1.670379	0.000000	.624491	.909778	.002548	0.000000	.831140	.519039	1.003376
2	.139198	1.670379	.482562	.612654	.928401	.002622	-.018959	.824774	.505301	1.003342
3	.139198	1.670379	.732863	.583202	.971212	.002876	-.004984	.807758	.471086	1.002198
4	.139198	1.670379	.862692	.560300	1.008223	.003360	.014624	.792932	.444280	.999696
5	.139198	1.670379	.930033	.553889	1.024962	.004003	.015276	.789429	.437256	.999872
6	.139198	1.670379	.964962	.547751	1.029518	.004663	.017948	.787520	.431365	1.001909
7	.139198	1.670379	.983080	.545767	1.027827	.005186	.017619	.788283	.430219	1.004337
8	.139198	1.670379	.992477	.541729	1.023224	.005423	.017983	.790357	.428159	1.009975
9	.139198	1.670379	.997351	.531162	.985275	.005161	.017105	.806880	.428584	1.039245
10	.139198	1.670379	.999880	.497803	.831796	.004084	.015045	.858578	.427403	1.134897
11	.139198	1.670379	1.001191	.462032	.522434	.002325	.009860	.926958	.428284	1.262384
12	.139198	1.670379	1.001871	.447061	.263984	.001078	.005103	.955872	.427333	1.319026
13	.139198	1.670379	1.002224	.444445	.121902	.000474	.002383	.963614	.428273	1.332834
14	.139198	1.670379	1.002407	.442651	.048256	.000182	.000954	.965391	.427331	1.337453
15	.139198	1.670379	1.002502	.443472	0.000000	0.000000	0.000000	.965726	.428273	1.336927

J= 15 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.139198	3.246102	0.000000	.624208	.906538	.003444	0.000000	.832047	.519371	1.004653
2	.139198	3.246102	.482562	.612602	.924937	.003383	-.019314	.825767	.505867	1.004584
3	.139198	3.246102	.732863	.583664	.967225	.003230	-.005847	.808974	.472169	1.003390
4	.139198	3.246102	.862692	.561070	1.003838	.003177	.013579	.794299	.445657	1.000868
5	.139198	3.246102	.930033	.554660	1.020466	.003441	.014523	.790756	.438601	1.000995
6	.139198	3.246102	.964962	.548601	1.024988	.003900	.017353	.788831	.432753	1.002954
7	.139198	3.246102	.983080	.546668	1.023450	.004353	.017133	.789512	.431601	1.005239
8	.139198	3.246102	.992477	.542648	1.018756	.004482	.017588	.791615	.429568	1.010896
9	.139198	3.246102	.997351	.531652	.978561	.003526	.016764	.808758	.429978	1.041280
10	.139198	3.246102	.999880	.497775	.818908	.000923	.014730	.861471	.428819	1.138748
11	.139198	3.246102	1.001191	.462899	.508364	-.001470	.009567	.928244	.429683	1.263187
12	.139198	3.246102	1.001871	.448681	.255833	-.001551	.004938	.955580	.428751	1.316715
13	.139198	3.246102	1.002224	.446248	.118044	-.000896	.002306	.962856	.429672	1.329630
14	.139198	3.246102	1.002407	.444520	.046717	-.000384	.000924	.964524	.428750	1.334002
15	.139198	3.246102	1.002502	.445330	0.000000	0.000000	0.000000	.964839	.429672	1.333466

J= 15 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.139198	3.577931	0.000000	.624044	.901652	.002456	0.000000	.833994	.520449	1.007110
2	.139198	3.577931	.482562	.612847	.919875	.002058	-.019810	.827846	.507343	1.006951
3	.139198	3.577931	.732863	.585023	.961704	.000720	-.007722	.811493	.474741	1.005577
4	.139198	3.577931	.862692	.563431	.997968	-.001396	.010329	.797283	.449214	1.002943
5	.139198	3.577931	.930033	.557218	1.014568	-.003414	.011354	.793736	.442284	1.002920
6	.139198	3.577931	.964962	.551191	1.019029	-.005244	.014575	.791753	.436407	1.004775
7	.139198	3.577931	.983080	.549107	1.016891	-.007158	.014812	.792640	.435244	1.007427
8	.139198	3.577931	.992477	.544026	1.007880	-.010398	.015785	.796211	.433160	1.015734
9	.139198	3.577931	.997351	.530482	.954101	-.017149	.015418	.817353	.433590	1.053274
10	.139198	3.577931	.999880	.495664	.776221	-.025716	.013642	.872387	.432411	1.155139
11	.139198	3.577931	1.001191	.464387	.472680	-.025031	.008800	.933079	.433309	1.268138
12	.139198	3.577931	1.001871	.451905	.238294	-.015717	.004578	.956728	.432350	1.314527
13	.139198	3.577931	1.002224	.449884	.110311	-.008007	.002151	.963138	.433300	1.325709
14	.139198	3.577931	1.002407	.448207	.043704	-.003312	.000865	.964619	.432349	1.329732
15	.139198	3.577931	1.002502	.449062	0.000000	0.000000	0.000000	.964900	.433299	1.329107

J= 15 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.139198	3.673434	0.000000	.622222	.892943	.001359	0.000000	.837330	.521005	1.012322
2	.139198	3.673434	.482562	.611205	.911396	.001142	-.017863	.831135	.507994	1.012038
3	.139198	3.673434	.732863	.584062	.953717	.000254	-.005440	.814738	.475857	1.010263
4	.139198	3.673434	.862692	.563500	.990530	-.001889	.010902	.800693	.451190	1.007183
5	.139198	3.673434	.930033	.557991	1.007656	-.005278	.009799	.797242	.444854	1.006791
6	.139198	3.673434	.964962	.552188	1.012088	-.010160	.011017	.795391	.439205	1.008663
7	.139198	3.673434	.983080	.549523	1.007093	-.017591	.010209	.797413	.438197	1.013186
8	.139198	3.673434	.992477	.541544	.984763	-.032419	.011527	.805417	.436169	1.029360
9	.139198	3.673434	.997351	.523410	.901779	-.057589	.012415	.834407	.436737	1.081038
10	.139198	3.673434	.999880	.490455	.708731	-.081974	.011376	.888081	.435564	1.180899
11	.139198	3.673434	1.001191	.464845	.435064	-.074192	.007667	.939076	.436524	1.275785
12	.139198	3.673434	1.001871	.453692	.218518	-.043179	.004076	.959924	.435510	1.316837
13	.139198	3.673434	1.002224	.452110	.101581	-.020917	.001953	.965507	.436515	1.326349
14	.139198	3.673434	1.002407	.450467	.040355	-.008424	.000799	.966794	.435509	1.330053

15	.139198	3.673434	1.002502	.451392	0 000000	0.000000	0.000000	.967040	.436514	1.329299

J= 15 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.139198	3.700921	0.000000	.615268	866391	.000422	0 000000	.846585	.520877	1.028123
2	.139198	3.700921	.482562	.604215	885269	.000280	- .007479	.840360	.507758	1.027990
3	.139198	3.700921	.732863	.576843	928252	- .000186	.013892	.823610	.475093	1.026357
4	.139198	3.700921	.862692	.555635	965292	- .001034	.035610	.809019	.449520	1.023394
5	.139198	3.700921	.930033	.549546	982704	- .001728	.034699	.805394	.442602	1.023309
6	.139198	3.700921	.964962	.543749	987655	- .003129	.032384	.803785	.437057	1.025606
7	.139198	3.700921	.983080	.540509	979748	- .011508	.028103	.807143	.436268	1.032356
8	.139198	3.700921	.992477	.530060	942674	- .039153	.027514	.819810	.434548	1.056776
9	.139198	3.700921	.997351	.511587	844726	- .081982	.024342	.850531	.435121	1.112045
10	.139198	3.700921	.999880	.485391	678545	- .123649	.016313	.894266	.434068	1.194070
11	.139198	3.700921	1.001191	.460470	422710	- .127383	.007080	.944493	.434911	1.288008
12	.139198	3.700921	1.001871	.447849	158688	- .083659	.002538	.969118	.434018	1.336363
13	.139198	3.700921	1.002224	.447500	066350	- .044244	.001149	.971831	.434894	1.340520
14	.139198	3.700921	1.002407	.446406	026095	- .018677	.000509	.972243	.434015	1.342402
15	.139198	3.700921	1.002502	.447280	0.000000	0 000000	0.000000	.972305	.434892	1.341438

J= 15 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.139198	3.708832	0 000000	.594730	773130	- .000460	0 000000	.876226	.521118	1.078669
2	.139198	3.708832	.482562	.583364	789832	- .000537	.015194	.871012	.508118	1.080559
3	.139198	3.708832	.732863	.555486	825840	- .000816	.055106	.856898	.475995	1.084077
4	.139198	3.708832	.862692	.533474	852879	- .001243	.088697	.845992	.451315	1.087730
5	.139198	3.708832	.930033	.526379	863783	- .001515	.095805	.845148	.444868	1.092480
6	.139198	3.708832	.964962	.520354	868556	- .002597	.100906	.843790	.439069	1.095758
7	.139198	3.708832	.983080	.516428	856533	- .009781	.099019	.848314	.438093	1.104976
8	.139198	3.708832	.992477	.497112	745662	- .025117	.085223	.880221	.437569	1.164153
9	.139198	3.708832	.997351	.474457	533068	- .025653	.056667	.927223	.439927	1.249412
10	.139198	3.708832	.999880	.455894	190203	.003554	.023773	.964851	.439870	1.321036
11	.139198	3.708832	1.001191	.461690	- .286987	.002062	- .000103	.955530	.441159	1.301679
12	.139198	3.708832	1.001871	.452219	- .261490	- .052209	- .003444	.973341	.440164	1.336982
13	.139198	3.708832	1.002224	.446360	- .130385	- .041604	- .002169	.988324	.441149	1.364662
14	.139198	3.708832	1.002407	.443392	- .050767	- .020089	- .000995	.992718	.440163	1.374392
15	.139198	3.708832	1.002502	.444009	0 000000	0 000000	0.000000	.993567	.441153	1.374804

J= 15 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.139198	3.711109	0 000000	.554757	.503537	- .000054	0 000000	.938977	.520904	1.188540
2	.139198	3.711109	.482562	.542352	.509418	- .000062	.034953	.936263	.507785	1.195874
3	.139198	3.711109	.732863	.511764	.515808	- .000110	.085512	.928399	.475122	1.213687
4	.139198	3.711109	.862692	.486199	.507572	- .000166	.120410	.924629	.449553	1.233791
5	.139198	3.711109	.930033	.476793	.497648	- .000181	.126824	.928401	.442656	1.248543
6	.139198	3.711109	.964962	.470365	.493623	- .000509	.129896	.929566	.437235	1.256915
7	.139198	3.711109	.983080	.462578	.388086	- .001920	.119715	.944795	.437041	1.286068
8	.139198	3.711109	.992477	.462126	- .170062	- .003441	.069750	.944511	.436483	1.286184
9	.139198	3.711109	.997351	.503929	- .561977	- .001509	.004870	.869487	.438160	1.143708
10	.139198	3.711109	.999880	.469970	- .225262	.001734	.001610	.933101	.438530	1.262119
11	.139198	3.711109	1.001191	.471768	- .430462	.003929	.015011	.928970	.438258	1.254615
12	.139198	3.711109	1.001871	.395681	- .131430	.012799	.011659	1.107460	.438201	1.604686
13	.139198	3.711109	1.002224	.354488	.199218	.007821	.006975	1.236269	.438242	1.871857
14	.139198	3.711109	1.002407	.351128	.092170	.002732	.001602	1.247504	.438033	1.896077
15	.139198	3.711109	1.002502	.352268	0 000000	0.000000	0.000000	1.244201	.438292	1.888606

J= 15 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.139198	3.711764	0.000000	.535905	.187634	.000003	0 000000	.972401	.521115	1.247987
2	.139198	3.711764	.482562	.523723	.188194	.000002	.017941	.970197	.508114	1.256665
3	.139198	3.711764	.732863	.494180	.185266	- .000008	.041541	.963195	.475991	1.276910
4	.139198	3.711764	.862692	.470482	.175346	- .000012	.054681	.959252	.451311	1.296926
5	.139198	3.711764	.930033	.462242	.167484	- .000002	.055148	.962410	.444866	1.310425
6	.139198	3.711764	.964962	.455901	.156503	- .000009	.054666	.963103	.439080	1.318635
7	.139198	3.711764	.983080	.455138	.090762	- .000009	.037704	.962766	.438191	1.319058
8	.139198	3.711764	.992477	.462110	- .052470	- .000006	.001695	.947859	.438015	1.290759
9	.139198	3.711764	.997351	.473740	- .164318	.000015	- .019548	.929621	.440399	1.253400
10	.139198	3.711764	.999880	.456242	- .115609	- .000014	- .014428	.963727	.439693	1.319095
11	.139198	3.711764	1.001191	.430042	- .170251	- .000049	- .012500	1.025797	.441135	1.437663

12	.139198	3.711764	1.001871	.375205	.111593	-.000243	-.000804	1.173762	.440401	1.737293
13	.139198	3.711764	1.002224	.365086	.093260	-.000220	.001193	1.208332	.441145	1.808124
14	.139198	3.711764	1.002407	.363993	.036517	-.000234	.000660	1.209860	.440380	1.812583
15	.139198	3.711764	1.002502	.365087	0.000000	0.000000	0.000000	1.208306	.441137	1.808083

J= 15 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.139198	3.711952	0.000000	.532865	0.000000	0.000000	0.000000	.977553	.520904	1.257457
2	.139198	3.711952	.482562	.520611	0.000000	0.000000	0.000000	.975362	.507784	1.266369
3	.139198	3.711952	.732863	.490681	0.000000	0.000000	0.000000	.968290	.475121	1.287318
4	.139198	3.711952	.862692	.466334	0.000000	0.000000	0.000000	.964016	.449554	1.307993
5	.139198	3.711952	.930033	.457827	0.000000	0.000000	0.000000	.966864	.442656	1.321554
6	.139198	3.711952	.964962	.452152	0.000000	0.000000	0.000000	.966994	.437228	1.328342
7	.139198	3.711952	.983080	.453369	0.000000	0.000000	0.000000	.963864	.436986	1.322620
8	.139198	3.711952	.992477	.459899	0.000000	0.000000	0.000000	.948215	.436084	1.293724
9	.139198	3.711952	.997351	.468114	0.000000	0.000000	0.000000	.934907	.437643	1.266566
10	.139198	3.711952	.999880	.455729	0.000000	0.000000	0.000000	.965387	.439955	1.321962
11	.139198	3.711952	1.001191	.429230	0.000000	0.000000	0.000000	1.030403	.442280	1.445210
12	.139198	3.711952	1.001871	.378344	0.000000	0.000000	0.000000	1.159076	.438530	1.709846
13	.139198	3.711952	1.002224	.367798	0.000000	0.000000	0.000000	1.189573	.437522	1.774792
14	.139198	3.711952	1.002407	.360215	0.000000	0.000000	0.000000	1.184760	.426769	1.782402
15	.139198	3.711952	1.002502	.362675	0.000000	0.000000	0.000000	1.196533	.433953	1.795220

J= 16 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	0.000000	0.000000	.588134	.968077	0.000000	0.000000	.811369	.477194	1.003293
2	.324796	0.000000	.484456	.578962	.978549	0.000000	.002137	.806223	.466772	1.003218
3	.324796	0.000000	.735740	.560378	.999979	0.000000	.021828	.794481	.445209	1.001592
4	.324796	0.000000	.866078	.554150	1.016997	0.000000	.028864	.789084	.437271	.999246
5	.324796	0.000000	.933684	.556843	1.025951	0.000000	.022904	.790636	.440260	.999272
6	.324796	0.000000	.968750	.554081	1.027056	0.000000	.023200	.790376	.437932	1.000931
7	.324796	0.000000	.986939	.555362	1.025412	0.000000	.020909	.792185	.439949	1.002297
8	.324796	0.000000	.996373	.550891	1.017800	0.000000	.020668	.795299	.438123	1.009496
9	.324796	0.000000	1.001267	.536626	.959802	0.000000	.019051	.819927	.439994	1.051735
10	.324796	0.000000	1.003805	.496688	.761931	0.000000	.015710	.882184	.438170	1.167147
11	.324796	0.000000	1.005122	.465885	.450681	0.000000	.009460	.944464	.440012	1.281958
12	.324796	0.000000	1.005805	.453271	.22133'	0.000000	.004700	.966708	.438180	1.326637
13	.324796	0.000000	1.006159	.452458	.101159	0.000000	.002146	.972499	.440015	1.335543
14	.324796	0.000000	1.006342	.449989	.039858	0.000000	.000849	.973760	.438182	1.340204
15	.324796	0.000000	1.006438	.451760	0.000000	0.000000	0.000000	.974002	.440015	1.338434

J= 16 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	1.670379	0.000000	.588225	.966535	.002496	0.000000	.811756	.477495	1.003710
2	.324796	1.670379	.484456	.579108	.976949	.002531	.001968	.806635	.467129	1.003629
3	.324796	1.670379	.735740	.560613	.998267	.002701	.021529	.794940	.445654	1.002004
4	.324796	1.670379	.866078	.554387	1.015221	.003111	.028611	.789549	.437716	.999664
5	.324796	1.670379	.933684	.557067	1.024156	.003719	.022730	.791087	.440689	.999680
6	.324796	1.670379	.968750	.554347	1.025304	.004400	.023048	.790806	.438381	1.001284
7	.324796	1.670379	.986939	.555666	1.023828	.005032	.020786	.792543	.440389	1.002530
8	.324796	1.670379	.996373	.551228	1.016295	.005448	.020566	.795634	.438576	1.009672
9	.324796	1.670379	1.001267	.536809	.957536	.005258	.018964	.820470	.440435	1.052289
10	.324796	1.670379	1.003805	.496752	.757728	.003943	.015612	.882983	.438624	1.168144
11	.324796	1.670379	1.005122	.466226	.446449	.002022	.009368	.944720	.440453	1.281931
12	.324796	1.670379	1.005805	.453814	.218874	.000851	.004647	.966549	.438634	1.325784
13	.324796	1.670379	1.006159	.453042	.099987	.000356	.002121	.972220	.440456	1.334471
14	.324796	1.670379	1.006342	.450597	.039391	.000135	.000839	.973452	.438635	1.339058
15	.324796	1.670379	1.006438	.452357	0.000000	0.000000	0.000000	.973690	.440456	1.337297

J= 16 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	3.246102	0.000000	.588622	.962513	.003114	0.000000	.813005	.478552	1.004983
2	.324796	3.246102	.484456	.579719	.972800	.002933	.001270	.807971	.468396	1.004867
3	.324796	3.246102	.735740	.561593	.993889	.002503	.020183	.796454	.447283	1.003211
4	.324796	3.246102	.866078	.555369	1.010752	.002207	.027349	.791045	.439321	1.000849
5	.324796	3.246102	.933684	.557889	1.019702	.002324	.021904	.792435	.442091	1.000794
6	.324796	3.246102	.968750	.555244	1.020984	.002696	.022358	.792073	.439794	1.002239
7	.324796	3.246102	.986939	.556532	1.019591	.003065	.020275	.793746	.441745	1.003425
8	.324796	3.246102	.996373	.551774	1.010617	.002788	.020149	.797358	.439961	1.011460

9	.324796	3.246102	1.001267	.536322	.946509	.000906	.018599	.823728	.441784	1.056850
10	.324796	3.246102	1.003805	.496085	.739132	-.002472	.015193	.886956	.440006	1.174032
11	.324796	3.246102	1.005122	.466979	.430443	-.004034	.009021	.946083	.441801	1.282952
12	.324796	3.246102	1.005805	.455322	.210388	-.002916	.004464	.966384	.440016	1.323800
13	.324796	3.246102	1.006159	.454691	.096081	-.001523	.002038	.971657	.441804	1.331761
14	.324796	3.246102	1.006342	.452319	.037850	-.000630	.000806	.972802	.440017	1.336122
15	.324796	3.246102	1.006438	.454053	0.000000	0.000000	0.000000	.973022	.441804	1.334382

J= 16 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	3.577847	0.000000	.589257	.957351	.001280	0.000000	.815199	.480362	1.007260
2	.324796	3.577847	.484456	.580710	.967650	.000767	.000557	.810268	.470530	1.007036
3	.324796	3.577847	.735740	.563431	.988848	-.000765	.018098	.799052	.450211	1.005168
4	.324796	3.577847	.866078	.557732	1.006011	-.002798	.024409	.793758	.442704	1.002578
5	.324796	3.577847	.933684	.560243	1.015281	-.004614	.019250	.794908	.445342	1.002227
6	.324796	3.577847	.968750	.557641	1.016698	-.006514	.019975	.794426	.443005	1.003487
7	.324796	3.577847	.986939	.558453	1.013728	-.009237	.018405	.796646	.444889	1.005705
8	.324796	3.577847	.996373	.551830	.996995	-.015069	.018685	.802899	.443064	1.018448
9	.324796	3.577847	1.001267	.533699	.917277	-.025356	.017472	.833574	.444877	1.071583
10	.324796	3.577847	1.003805	.494632	.701105	-.034492	.014226	.895785	.443084	1.187109
11	.324796	3.577847	1.005122	.468793	.407444	-.029510	.008484	.949011	.444889	1.284928
12	.324796	3.577847	1.005805	.458100	.201084	-.017400	.004256	.967241	.443093	1.321755
13	.324796	3.577847	1.006159	.457641	.092294	-.008602	.001956	.972140	.444892	1.328981
14	.324796	3.577847	1.006342	.455291	.036406	-.003512	.000776	.973211	.443094	1.333189
15	.324796	3.577847	1.006438	.457040	0.000000	0.000000	0.000000	.973420	.444892	1.331430

J= 16 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	3.673386	0.000000	.588096	.949887	-.000137	0.000000	.818363	.481277	1.011968
2	.324796	3.673386	.484456	.579610	.960352	-.000301	.003119	.813337	.471418	1.011617
3	.324796	3.673386	.735740	.562627	.981973	-.000919	.021630	.801956	.451202	1.009398
4	.324796	3.673386	.866078	.557423	.999753	-.002295	.027089	.796610	.444048	1.006403
5	.324796	3.673386	.933684	.560389	1.009765	-.004773	.020397	.797667	.447004	1.005601
6	.324796	3.673386	.968750	.557984	1.011312	-.009176	.019584	.797342	.444904	1.006922
7	.324796	3.673386	.986939	.557722	1.004194	-.017452	.017187	.801145	.446816	1.011915
8	.324796	3.673386	.996373	.548174	.973122	-.034559	.017277	.812064	.445153	1.032816
9	.324796	3.673386	1.001267	.529050	.880227	-.061631	.016113	.844822	.446954	1.089849
10	.324796	3.673386	1.003805	.497022	.695350	-.083572	.013546	.895884	.445274	1.184954
11	.324796	3.673386	1.005122	.472982	.438810	-.070371	.008970	.945073	.447003	1.275051
12	.324796	3.673386	1.005805	.460568	.218759	-.039103	.004584	.966816	.445285	1.318336
13	.324796	3.673386	1.006159	.459539	.100146	-.018513	.002112	.972725	.447005	1.327581
14	.324796	3.673386	1.006342	.457160	.039505	-.007381	.000842	.974026	.445286	1.332120
15	.324796	3.673386	1.006438	.458808	0.000000	0.000000	0.000000	.974276	.447005	1.330545

J= 16 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	3.700900	0.000000	.580672	.923344	-.000800	0.000000	.828287	.480963	1.029458
2	.324796	3.700900	.484456	.572038	.933046	-.000899	.014812	.823405	.471018	1.029541
3	.324796	3.700900	.735740	.554449	.952347	-.001198	.042802	.812273	.450363	1.028389
4	.324796	3.700900	.866078	.548081	.967366	-.001591	.053729	.807235	.442430	1.026744
5	.324796	3.700900	.933684	.550210	.976167	-.001923	.048005	.808617	.444910	1.026908
6	.324796	3.700900	.968750	.547384	.976868	-.003445	.044983	.808987	.442827	1.029496
7	.324796	3.700900	.986939	.545763	.963056	-.010180	.041341	.815585	.445116	1.039124
8	.324796	3.700900	.996373	.533929	.917544	-.028610	.038831	.830572	.443466	1.067539
9	.324796	3.700900	1.001267	.522594	.849278	-.057374	.032249	.852804	.445670	1.105563
10	.324796	3.700900	1.003805	.506956	.769617	-.095511	.023010	.875455	.443817	1.148803
11	.324796	3.700900	1.005122	.482054	.565025	-.099741	.013247	.924801	.445804	1.238255
12	.324796	3.700900	1.005805	.458970	.222139	-.060447	.004911	.967076	.443858	1.320526
13	.324796	3.700900	1.006159	.458094	.084780	-.029626	.001817	.973186	.445811	1.329884
14	.324796	3.700900	1.006342	.455694	.032050	-.012182	.000681	.974033	.443861	1.333842
15	.324796	3.700900	1.006438	.457623	0.000000	0.000000	0.000000	.974188	.445811	1.331802

J= 16 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	3.708824	0.000000	.555784	.810720	-.000778	0.000000	.866155	.481395	1.095553
2	.324796	3.708824	.484456	.546671	.815663	-.000801	.034999	.862554	.471534	1.098237
3	.324796	3.708824	.735740	.527865	.822084	-.000901	.077025	.854960	.451303	1.103918
4	.324796	3.708824	.866078	.519755	.822919	-.000965	.094377	.854429	.444093	1.110085
5	.324796	3.708824	.933684	.520508	.824096	-.001084	.094181	.858658	.446938	1.114934

6	.324796	3.708824	.968750	.516164	.815845	-.003163	.096145	.861627	.444741	1.122546
7	.324796	3.708824	.986939	.508121	.759486	-.010369	.091863	.878819	.446546	1.152159
8	.324796	3.708824	.996373	.487813	.619694	-.015230	.080522	.912836	.445293	1.216441
9	.324796	3.708824	1.001267	.477487	.501884	-.000689	.057063	.937308	.447553	1.259788
10	.324796	3.708824	1.003805	.459763	.095111	.035174	.026823	.972082	.446927	1.326446
11	.324796	3.708824	1.005122	.490932	-.522761	.044094	-.003769	.913712	.448571	1.214509
12	.324796	3.708824	1.005805	.486722	-.552653	.003809	-.009812	.918999	.447297	1.225752
13	.324796	3.708824	1.006159	.467034	-.286558	-.008987	-.005599	.960566	.448617	1.302531
14	.324796	3.708824	1.006342	.459881	-.113204	-.005654	-.002381	.972652	.447305	1.327087
15	.324796	3.708824	1.006438	.460161	0.000000	0.000000	0.000000	.974927	.448623	1.329867

J= 16 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	3.711106	0.000000	.510903	.487669	-.000060	0.000000	.941414	.480971	1.231530
2	.324796	3.711106	.484456	.501604	.482740	-.000064	.041009	.939036	.471024	1.237479
3	.324796	3.711106	.735740	.482011	.464602	-.000087	.080271	.934347	.450365	1.251081
4	.324796	3.711106	.866078	.472355	.442880	-.000071	.091317	.936647	.442430	1.264354
5	.324796	3.711106	.933684	.472006	.432586	-.000056	.087830	.942635	.444929	1.272813
6	.324796	3.711106	.968750	.466010	.366475	-.000351	.082178	.950677	.443025	1.290252
7	.324796	3.711106	.986939	.461784	.036707	-.001208	.044532	.965351	.445784	1.314951
8	.324796	3.711106	.996373	.471440	-.277616	-.001900	-.019885	.941518	.443870	1.271914
9	.324796	3.711106	1.001267	.457325	-.017086	.000773	-.045735	.973671	.445284	1.331442
10	.324796	3.711106	1.003805	.456994	-.105533	.004799	-.029261	.974448	.445317	1.332890
11	.324796	3.711106	1.005122	.506485	-.755455	.003097	-.016608	.884211	.447840	1.160725
12	.324796	3.711106	1.005805	.441279	-.333024	.003548	-.005065	1.010408	.445872	1.401560
13	.324796	3.711106	1.006159	.425096	-.111445	.004772	-.001735	1.053431	.447810	1.483239
14	.324796	3.711106	1.006342	.420700	-.040746	.003220	-.000835	1.059796	.445856	1.498419
15	.324796	3.711106	1.006438	.422254	0.000000	0.000000	0.000000	1.060535	.447815	1.497254

J= 16 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	3.711763	0.000000	.494941	.173114	.000005	0.000000	.972625	.481392	1.288617
2	.324796	3.711763	.484456	.486329	.169506	.000002	.017785	.969572	.471531	1.293624
3	.324796	3.711763	.735740	.468627	.158006	-.000008	.033358	.963027	.451300	1.304090
4	.324796	3.711763	.866078	.460958	.145906	-.000001	.034657	.963408	.444091	1.313245
5	.324796	3.711763	.933684	.461518	.139877	.000010	.031679	.968405	.446937	1.319416
6	.324796	3.711763	.968750	.459115	.108507	.000001	.028521	.968721	.444754	1.322606
7	.324796	3.711763	.986939	.462671	-.002998	.000013	.010180	.965485	.446702	1.314124
8	.324796	3.711763	.996373	.465552	-.085647	.000009	-.014934	.957579	.445803	1.300131
9	.324796	3.711763	1.001267	.460403	-.033092	-.000005	-.026387	.972885	.447919	1.326801
10	.324796	3.711763	1.003805	.453586	-.089615	.000004	-.012359	.985148	.446652	1.351806
11	.324796	3.711763	1.005122	.449968	-.303856	.000035	-.011474	.995417	.447906	1.370036
12	.324796	3.711763	1.005805	.424180	-.088788	.000040	-.004804	1.053429	.446844	1.484516
13	.324796	3.711763	1.006159	.419386	-.028360	.000068	-.001587	1.068149	.447967	1.512120
14	.324796	3.711763	1.006342	.417156	-.010573	.000056	-.000199	1.071190	.446853	1.519663
15	.324796	3.711763	1.006438	.418009	0.000000	0.000000	0.000000	1.071628	.447951	1.519042

J= 16 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.324796	3.711952	0.000000	.492308	0.000000	0.000000	0.000000	.976971	.480971	1.297141
2	.324796	3.711952	.484456	.483720	0.000000	0.000000	0.000000	.973753	.471024	1.302000
3	.324796	3.711952	.735740	.465850	0.000000	0.000000	0.000000	.966760	.450365	1.312261
4	.324796	3.711952	.866078	.457678	0.000000	0.000000	0.000000	.966684	.442430	1.321479
5	.324796	3.711952	.933684	.458009	0.000000	0.000000	0.000000	.971437	.444927	1.327593
6	.324796	3.711952	.968750	.456423	0.000000	0.000000	0.000000	.970518	.442967	1.328179
7	.324796	3.711952	.986939	.461355	0.000000	0.000000	0.000000	.965659	.445512	1.315860
8	.324796	3.711952	.996373	.462471	0.000000	0.000000	0.000000	.958959	.443491	1.305468
9	.324796	3.711952	1.001267	.458041	0.000000	0.000000	0.000000	.972361	.445381	1.328819
10	.324796	3.711952	1.003805	.452998	0.000000	0.000000	0.000000	.987011	.447114	1.354826
11	.324796	3.711952	1.005122	.445893	0.000000	0.000000	0.000000	1.011651	.451088	1.397457
12	.324796	3.711952	1.005805	.424325	0.000000	0.000000	0.000000	1.055729	.447972	1.487555
13	.324796	3.711952	1.006159	.419342	0.000000	0.000000	0.000000	1.069161	.448344	1.513616
14	.324796	3.711952	1.006342	.414948	0.000000	0.000000	0.000000	1.069576	.443818	1.520597
15	.324796	3.711952	1.006438	.416480	0.000000	0.000000	0.000000	1.070602	.445884	1.519813

J= 17 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	0.000000	0.000000	.553322	1.015686	0.000000	0.000000	.792153	.438316	1.003733
2	.603192	0.000000	.487298	.549667	1.017704	0.000000	.013515	.789656	.434048	1.003225

3	.603192	0.000000	.740055	.545474	1.022205	0.000000	.024305	.785899	.428687	1.001513
4	.603192	0.000000	.871159	.548796	1.029408	0.000000	.021707	.786400	.431573	.999722
5	.603192	0.000000	.939161	.550713	1.037210	0.000000	.020673	.787053	.433440	.999157
6	.603192	0.000000	.974433	.549650	1.040545	0.000000	.021407	.786519	.432310	.999251
7	.603192	0.000000	.992728	.550306	1.040647	0.000000	.020791	.787878	.433574	1.000501
8	.603192	0.000000	1.002218	.543324	1.021682	0.000000	.020673	.795805	.432379	1.015741
9	.603192	0.000000	1.007140	.521740	.932421	0.000000	.018943	.831006	.433569	1.078009
10	.603192	0.000000	1.009693	.481578	.704998	0.000000	.014743	.897835	.432378	1.202624
11	.603192	0.000000	1.011017	.455979	.412788	0.000000	.008716	.950845	.433565	1.301763
12	.603192	0.000000	1.011704	.446157	.206980	0.000000	.004394	.969114	.432377	1.338380
13	.603192	0.000000	1.012061	.445137	.096339	0.000000	.002042	.974001	.433564	1.346361
14	.603192	0.000000	1.012245	.443412	.038317	0.000000	.000814	.975113	.432377	1.349995
15	.603192	0.000000	1.012341	.444531	0.000000	0.000000	0.000000	.975328	.433564	1.348931

J= 17 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	1.670379	0.000000	.553685	1.014024	.001945	0.000000	.792674	.438892	1.004129
2	.603192	1.670379	.487298	.550044	1.016042	.001927	.013270	.790183	.434636	1.003619
3	.603192	1.670379	.740055	.545827	1.020556	.001968	.023999	.786407	.429242	1.001902
4	.603192	1.670379	.871159	.549068	1.027778	.002223	.021524	.786852	.432035	1.000098
5	.603192	1.670379	.939161	.550983	1.035607	.002709	.020527	.787474	.433884	.999496
6	.603192	1.670379	.974433	.549954	1.039012	.003338	.021275	.786908	.432763	.999525
7	.603192	1.670379	.992728	.550595	1.039078	.003962	.020689	.788272	.434019	1.000790
8	.603192	1.670379	1.002218	.543478	1.019496	.004273	.020581	.796414	.432833	1.016404
9	.603192	1.670379	1.007140	.521613	.928537	.003778	.018847	.832060	.434014	1.079482
10	.603192	1.670379	1.009693	.481520	.699385	.002221	.014623	.898885	.432831	1.204088
11	.603192	1.670379	1.011017	.456301	.408279	.000695	.008620	.951149	.434010	1.301811
12	.603192	1.670379	1.011704	.446666	.204552	.000125	.004342	.969025	.432831	1.337648
13	.603192	1.670379	1.012061	.445684	.095207	.000015	.002018	.973805	.434009	1.345430
14	.603192	1.670379	1.012245	.443978	.037869	-.000000	.000804	.974893	.432830	1.349001
15	.603192	1.670379	1.012341	.445091	0.000000	0.000000	0.000000	.975103	.434009	1.347941

J= 17 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	3.246102	0.000000	.554740	1.010082	.001779	0.000000	.794141	.440542	1.005221
2	.603192	3.246102	.487298	.551197	1.012144	.001548	.012495	.791683	.436373	1.004681
3	.603192	3.246102	.740055	.547057	1.016788	.001010	.022830	.787898	.431025	1.002899
4	.603192	3.246102	.871159	.550127	1.024157	.000567	.020624	.788161	.433589	1.000990
5	.603192	3.246102	.939161	.551957	1.032120	.000449	.019888	.788613	.435280	1.000234
6	.603192	3.246102	.974433	.550959	1.035599	.000501	.020750	.787987	.434149	1.000165
7	.603192	3.246102	.992728	.551345	1.034852	.000253	.020314	.789618	.435352	1.001953
8	.603192	3.246102	1.002218	.543462	1.011906	-.001161	.020249	.798930	.434188	1.019626
9	.603192	3.246102	1.007140	.520588	.914446	-.004147	.018503	.836244	.435339	1.085764
10	.603192	3.246102	1.009693	.481048	.680915	-.007150	.014225	.902580	.434184	1.209512
11	.603192	3.246102	1.011017	.457151	.394970	-.006767	.008334	.952278	.435335	1.302386
12	.603192	3.246102	1.011704	.448065	.197827	-.004179	.004198	.969018	.434183	1.335965
13	.603192	3.246102	1.012061	.44718'	.092132	-.002081	.001952	.973507	.435334	1.343215
14	.603192	3.246102	1.012245	.445531	.036656	-.000847	.000778	.974529	.434183	1.346615
15	.603192	3.246102	1.012341	.446622	0.000000	0.000000	0.000000	.974726	.435334	1.345572

J= 17 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	3.577720	0.000000	.555858	1.005765	-.000543	0.000000	.796249	.442602	1.007079
2	.603192	3.577720	.487298	.552478	1.007965	-.000905	.012166	.793818	.438567	1.006457
3	.603192	3.577720	.740055	.548743	1.012983	-.001992	.021767	.790108	.433566	1.004475
4	.603192	3.577720	.871159	.552153	1.020775	-.003566	.018992	.790338	.436388	1.002280
5	.603192	3.577720	.939161	.554167	1.029054	-.005347	.018120	.790654	.438155	1.001222
6	.603192	3.577720	.974433	.553136	1.032196	-.007666	.019117	.790152	.437061	1.001332
7	.603192	3.577720	.992728	.552676	1.028249	-.011696	.019016	.792931	.438234	1.005188
8	.603192	3.577720	1.002218	.542918	.996802	-.019453	.019210	.805053	.437077	1.027852
9	.603192	3.577720	1.007140	.518916	.889370	-.029925	.017663	.844463	.438205	1.097848
10	.603192	3.577720	1.009693	.481522	.658058	-.035255	.013623	.907675	.437065	1.215861
11	.603192	3.577720	1.011017	.459409	.384742	-.027281	.008083	.953833	.438200	1.301944
12	.603192	3.577720	1.011704	.450695	.194451	-.015544	.004120	.969756	.437064	1.333857
13	.603192	3.577720	1.012061	.449838	.090871	-.007610	.001925	.974126	.438199	1.340888
14	.603192	3.577720	1.012245	.448212	.036186	-.003099	.000769	.975128	.437064	1.344213
15	.603192	3.577720	1.012341	.449286	0.000000	0.000000	0.000000	.975322	.438199	1.343194

J= 17 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	3.673313	0.000000	.554078	.997618	-.000962	0.000000	.799685	.443088	1.012723
2	.603192	3.673313	.487298	.550591	.999704	-.000936	.015430	.797187	.438924	1.012112
3	.603192	3.673313	.740055	.546726	1.004457	-.001015	.026728	.793408	.433777	1.010157
4	.603192	3.673313	.871159	.550335	1.012068	-.001746	.023571	.793764	.436836	1.007953
5	.603192	3.673313	.939161	.552737	1.020276	-.003827	.021196	.794322	.439051	1.006906
6	.603192	3.673313	.974433	.551560	1.022078	-.008212	.020812	.794560	.438247	1.008068
7	.603192	3.673313	.992728	.549697	1.012153	-.016715	.019656	.799585	.439530	1.015816
8	.603192	3.673313	1.002218	.538234	.970460	-.032454	.019092	.814687	.438492	1.043764
9	.603192	3.673313	1.007140	.516707	.866610	-.052672	.017141	.850803	.439616	1.107979
10	.603192	3.673313	1.009693	.485296	.672168	-.063115	.013672	.903637	.438531	1.206678
11	.603192	3.673313	1.011017	.462780	.415384	-.048579	.008656	.949958	.439622	1.292869
12	.603192	3.673313	1.011704	.452686	.212468	-.026608	.004484	.968730	.438531	1.330099
13	.603192	3.673313	1.012061	.451372	.099252	-.012616	.002099	.973966	.439621	1.338843
14	.603192	3.673313	1.012245	.449695	.039510	-.005051	.000839	.975172	.438530	1.342499
15	.603192	3.673313	1.012341	.450706	0.000000	0.000000	0.000000	.975405	.439621	1.341615

J= 17 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	3.700869	0.000000	.543218	.957716	-.001127	0.000000	.814863	.442648	1.040147
2	.603192	3.700869	.487298	.539540	.958236	-.001125	.025504	.812740	.438506	1.040261
3	.603192	3.700869	.740055	.534923	.958998	-.001116	.044460	.809851	.433208	1.040133
4	.603192	3.700869	.871159	.537239	.962326	-.001130	.045507	.811162	.435788	1.040018
5	.603192	3.700869	.939161	.538513	.967212	-.001380	.044001	.812636	.437615	1.040921
6	.603192	3.700869	.974433	.536118	.963733	-.002752	.041765	.814919	.436893	1.045708
7	.603192	3.700869	.992728	.532002	.941915	-.007594	.037593	.824049	.438396	1.060688
8	.603192	3.700869	1.002218	.520194	.889318	-.018407	.032236	.841325	.437652	1.092692
9	.603192	3.700869	1.007140	.507523	.814777	-.035467	.025154	.864839	.438926	1.134365
10	.603192	3.700869	1.009693	.488404	.697875	-.052534	.017666	.896627	.437916	1.194264
11	.603192	3.700869	1.011017	.465362	.463027	-.049582	.010581	.943372	.439010	1.281051
12	.603192	3.700869	1.011704	.452593	.222493	-.028865	.004897	.967591	.437925	1.328643
13	.603192	3.700869	1.012061	.451125	.099391	-.013989	.002139	.973147	.439010	1.338011
14	.603192	3.700869	1.012245	.449476	.039128	-.005642	.000830	.974303	.437925	1.341564
15	.603192	3.700869	1.012341	.450489	0.000000	0.000000	0.000000	.974521	.439011	1.340657

J= 17 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	3.708812	0.000000	.510990	.801450	-.000576	0.000000	.867156	.443109	1.134312
2	.603192	3.708812	.487298	.506903	.797586	-.000563	.036897	.865940	.438948	1.136365
3	.603192	3.708812	.740055	.501219	.787856	-.000527	.062584	.865490	.433801	1.140909
4	.603192	3.708812	.871159	.502301	.781075	-.000455	.066476	.869669	.436835	1.145429
5	.603192	3.708812	.939161	.502607	.777961	-.000600	.067944	.873419	.438987	1.150088
6	.603192	3.708812	.974433	.498001	.756896	-.001738	.068301	.879642	.438063	1.162557
7	.603192	3.708812	.992728	.489456	.690590	-.003853	.063270	.897526	.439300	1.194433
8	.603192	3.708812	1.002218	.475714	.582219	-.004352	.051210	.921467	.438355	1.240341
9	.603192	3.708812	1.007140	.465273	.452772	.002625	.035173	.945460	.439897	1.283985
10	.603192	3.708812	1.009693	.451940	.177580	.013437	.016433	.971208	.438928	1.334382
11	.603192	3.708812	1.011017	.452756	-.059416	.011596	.002798	.972291	.440211	1.334907
12	.603192	3.708812	1.011704	.451672	-.085963	.000966	-.000765	.971976	.439015	1.335753
13	.603192	3.708812	1.012061	.452349	-.045208	-.001568	-.000717	.973190	.440222	1.336620
14	.603192	3.708812	1.012245	.450976	-.017854	-.001065	-.000377	.973481	.439017	1.338647
15	.603192	3.708812	1.012341	.452188	0.000000	0.000000	0.000000	.973542	.440225	1.337295

J= 17 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	3.711102	0.000000	.467764	.434607	-.000020	0.000000	.946292	.442642	1.282372
2	.603192	3.711102	.487298	.464094	.427069	-.000023	.029969	.944849	.438499	1.284458
3	.603192	3.711102	.740055	.458959	.409744	-.000020	.047514	.943873	.433199	1.288855
4	.603192	3.711102	.871159	.459893	.397624	.000012	.046873	.947570	.435781	1.292851
5	.603192	3.711102	.939161	.460070	.384940	.000006	.046998	.951211	.437624	1.297620
6	.603192	3.711102	.974433	.456278	.315279	-.000142	.040337	.957647	.436954	1.310731
7	.603192	3.711102	.992728	.453592	.152439	-.000438	.016461	.966698	.438487	1.326248
8	.603192	3.711102	1.002218	.451342	.076691	-.000466	-.008769	.969873	.437745	1.333253
9	.603192	3.711102	1.007140	.450410	.164984	.000854	-.012842	.974641	.438988	1.340916
10	.603192	3.711102	1.009693	.448753	.035909	.001642	-.004909	.976761	.438324	1.345815
11	.603192	3.711102	1.011017	.450739	-.107776	.000582	-.002059	.974686	.439329	1.340586
12	.603192	3.711102	1.011704	.448289	-.080753	.001491	-.001313	.977810	.438342	1.347819

13	.603192	3.711102	1.012061	.448355	-.040119	.001946	-.000725	.979862	.439326	1.350567
14	.603192	3.711102	1.012245	.447106	-.015878	.001609	-.000328	.980398	.438341	1.352815
15	.603192	3.711102	1.012341	.448064	0.000000	0.000000	0.000000	.980502	.439327	1.351800

J= 17 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	3.711762	0.000000	.456471	.146750	.000000	0.000000	.970723	.443107	1.328404
2	.603192	3.711762	.487298	.453211	.143141	-.000002	.011321	.968525	.438946	1.329201
3	.603192	3.711762	.740055	.449086	.135088	-.000003	.016887	.965960	.433799	1.330538
4	.603192	3.711762	.871159	.451004	.129967	.000006	.014880	.968580	.436833	1.331875
5	.603192	3.711762	.939161	.452194	.124570	.000004	.015262	.970787	.438984	1.333503
6	.603192	3.711762	.974433	.451498	.095854	.000001	.012620	.970255	.438069	1.333594
7	.603192	3.711762	.992728	.453393	.035915	.000005	.002639	.969055	.439363	1.329715
8	.603192	3.711762	1.002218	.452112	.012431	.000001	-.007941	.969987	.438543	1.332501
9	.603192	3.711762	1.007140	.449808	.050338	.000003	-.007976	.978079	.439947	1.346366
10	.603192	3.711762	1.009693	.448127	.005660	.000005	-.001660	.978870	.438658	1.349474
11	.603192	3.711762	1.011017	.448837	-.042374	.000009	-.003079	.980023	.439870	1.350209
12	.603192	3.711762	1.011704	.446573	-.029288	.000008	-.001802	.982437	.438730	1.356276
13	.603192	3.711762	1.012061	.447199	-.013646	.000015	-.000796	.983656	.439890	1.357197
14	.603192	3.711762	1.012245	.445904	-.005223	.000012	-.000100	.983927	.438737	1.359148
15	.603192	3.711762	1.012341	.447034	0.000000	0.000000	0.000000	.984003	.439883	1.357877

J= 17 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.603192	3.711952	0.000000	.454551	0.000000	0.000000	0.000000	.973800	.442642	1.334864
2	.603192	3.711952	.487298	.451374	0.000000	0.000000	0.000000	.971475	.438498	1.335418
3	.603192	3.711952	.740055	.447225	0.000000	0.000000	0.000000	.968638	.433199	1.336446
4	.603192	3.711952	.871159	.448761	0.000000	0.000000	0.000000	.971075	.435780	1.337972
5	.603192	3.711952	.939161	.449734	0.000000	0.000000	0.000000	.973064	.437620	1.339550
6	.603192	3.711952	.974433	.449699	0.000000	0.000000	0.000000	.971592	.436925	1.337566
7	.603192	3.711952	.992728	.452293	0.000000	0.000000	0.000000	.969273	.438395	1.331307
8	.603192	3.711952	1.002218	.451209	0.000000	0.000000	0.000000	.969959	.437654	1.333528
9	.603192	3.711952	1.007140	.448892	0.000000	0.000000	0.000000	.978399	.439196	1.347905
10	.603192	3.711952	1.009693	.448321	0.000000	0.000000	0.000000	.979387	.439080	1.349954
11	.603192	3.711952	1.011017	.448864	0.000000	0.000000	0.000000	.980764	.440229	1.351197
12	.603192	3.711952	1.011704	.446258	0.000000	0.000000	0.000000	.983122	.438726	1.357604
13	.603192	3.711952	1.012061	.446441	0.000000	0.000000	0.000000	.984339	.439450	1.359060
14	.603192	3.711952	1.012245	.445388	0.000000	0.000000	0.000000	.984481	.438476	1.360541
15	.603192	3.711952	1.012341	.446211	0.000000	0.000000	0.000000	.984242	.439179	1.359208

J= 18 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	0.000000	0.000000	.527146	1.049503	0.000000	0.000000	.776884	.409531	1.003653
2	1.206385	0.000000	.493455	.527136	1.048358	0.000000	.012090	.776485	.409314	1.003145
3	1.206385	0.000000	.749406	.529003	1.047825	0.000000	.016975	.776571	.410808	1.001839
4	1.206385	0.000000	.882166	.531892	1.052508	0.000000	.017007	.777067	.413316	1.000298
5	1.206385	0.000000	.951027	.532035	1.060370	0.000000	.020010	.776001	.412860	.998817
6	1.206385	0.000000	.986745	.532663	1.066438	0.000000	.020685	.775390	.413022	.997560
7	1.206385	0.000000	1.005271	.531192	1.064719	0.000000	.021198	.777414	.412956	1.001271
8	1.206385	0.000000	1.014881	.521072	1.029646	0.000000	.020750	.792586	.412995	1.028697
9	1.206385	0.000000	1.019865	.493375	.909937	0.000000	.018659	.836991	.412950	1.110325
10	1.206385	0.000000	1.022451	.456389	.665987	0.000000	.013928	.904903	.412988	1.238420
11	1.206385	0.000000	1.023792	.434221	.387077	0.000000	.008174	.951007	.412947	1.327698
12	1.206385	0.000000	1.024487	.427146	.196155	0.000000	.004148	.966852	.412986	1.358719
13	1.206385	0.000000	1.024848	.425249	.091851	0.000000	.001945	.971068	.412946	1.367075
14	1.206385	0.000000	1.025035	.424848	.036630	0.000000	.000776	.972080	.412986	1.369016
15	1.206385	0.000000	1.025132	.424723	0.000000	0.000000	0.000000	.972271	.412946	1.369447

J= 18 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	1.670379	0.000000	.527649	1.048172	.001011	0.000000	.777393	.410191	1.003928
2	1.206385	1.670379	.493455	.527623	1.047060	.000965	.011896	.776978	.409952	1.003411
3	1.206385	1.670379	.749406	.529422	1.046595	.000911	.016779	.777001	.411361	1.002077
4	1.206385	1.670379	.882166	.532248	1.051343	.000998	.016900	.777423	.413782	1.000487
5	1.206385	1.670379	.951027	.532415	1.059266	.001283	.019900	.776320	.413324	.998943
6	1.206385	1.670379	.986745	.533043	1.065320	.001704	.020592	.775704	.413483	.997680
7	1.206385	1.670379	1.005271	.531474	1.063208	.002038	.021121	.777870	.413417	1.001645
8	1.206385	1.670379	1.014881	.521095	1.026967	.001892	.020672	.793436	.413456	1.029782
9	1.206385	1.670379	1.019865	.493179	.905417	.000935	.018562	.838260	.413412	1.112185

10	1.206385	1.670379	1.022451	.456411	.660699	-.000487	.013818	.905870	.413450	1.239719
11	1.206385	1.670379	1.023792	.434583	.383439	-.001088	.008097	.951277	.413409	1.327633
12	1.206385	1.670379	1.024487	.427632	.194301	-.000788	.004109	.966830	.413448	1.358069
13	1.206385	1.670379	1.024848	.425768	.090998	-.000407	.001927	.970971	.413408	1.366271
14	1.206385	1.670379	1.025035	.425373	.036293	-.000168	.000769	.971965	.413447	1.368178
15	1.206385	1.670379	1.025132	.425250	0.000000	0.000000	0.000000	.972153	.413408	1.368601

J= 18 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	3.246102	0.000000	.528940	1.045211	.000214	0.000000	.778717	.411895	1.004655
2	1.206385	3.246102	.493455	.528931	1.044201	.000019	.011389	.778284	.411658	1.004103
3	1.206385	3.246102	.749406	.530705	1.043958	-.000473	.016086	.778212	.413001	1.002666
4	1.206385	3.246102	.882166	.533456	1.048907	-.001019	.016332	.778460	.415274	1.000915
5	1.206385	3.246102	.951027	.533621	1.056961	-.001435	.019434	.777234	.414748	.999214
6	1.206385	3.246102	.986745	.534157	1.062708	-.001872	.020234	.776694	.414876	.998119
7	1.206385	3.246102	1.005271	.532132	1.058826	-.002952	.020848	.779493	.414793	1.003239
8	1.206385	3.246102	1.014881	.520870	1.018488	-.005348	.020407	.796419	.414831	1.033832
9	1.206385	3.246102	1.019865	.492444	.891764	-.008675	.018261	.842294	.414782	1.118204
10	1.206385	3.246102	1.022451	.456532	.646306	-.010399	.013512	.908639	.414823	1.243378
11	1.206385	3.246102	1.023792	.435648	.374435	-.008233	.007904	.952096	.414779	1.327475
12	1.206385	3.246102	1.024487	.429004	.189940	-.004746	.004016	.966939	.414821	1.356483
13	1.206385	3.246102	1.024848	.427208	.089017	-.002315	.001885	.970904	.414778	1.364334
14	1.206385	3.246102	1.025035	.426833	.035512	-.000936	.000752	.971858	.414821	1.366154
15	1.206385	3.246102	1.025132	.426709	0.000000	0.000000	0.000000	.972038	.414778	1.366566

J= 18 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	3.577449	0.000000	.529661	1.041305	-.001616	0.000000	.780673	.413492	1.006630
2	1.206385	3.577449	.493455	.529694	1.040383	-.001791	.011663	.780234	.413285	1.006039
3	1.206385	3.577449	.749406	.531685	1.040341	-.002468	.016084	.780201	.414821	1.004489
4	1.206385	3.577449	.882166	.534804	1.045465	-.003773	.015681	.780533	.417433	1.002567
5	1.206385	3.577449	.951027	.535155	1.053418	-.005568	.018413	.779406	.417103	1.000857
6	1.206385	3.577449	.986745	.535388	1.057835	-.008196	.019260	.779372	.417266	1.000639
7	1.206385	3.577449	1.005271	.532352	1.049720	-.012888	.020012	.783707	.417208	1.008496
8	1.206385	3.577449	1.014881	.519774	1.002451	-.020430	.019720	.802726	.417237	1.042897
9	1.206385	3.577449	1.019865	.491611	.871682	-.028275	.017697	.848633	.417197	1.127382
10	1.206385	3.577449	1.022451	.457671	.632447	-.029336	.013172	.911634	.417228	1.246233
11	1.206385	3.577449	1.023792	.437762	.369427	-.020951	.007788	.953014	.417194	1.326185
12	1.206385	3.577449	1.024487	.431245	.188450	-.011597	.003984	.967493	.417226	1.354435
13	1.206385	3.577449	1.024848	.429471	.088478	-.005634	.001874	.971412	.417193	1.362165
14	1.206385	3.577449	1.025035	.429087	.035314	-.002288	.000749	.972357	.417226	1.363979
15	1.206385	3.577449	1.025132	.428974	0.000000	0.000000	0.000000	.972537	.417193	1.364374

J= 18 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	3.673157	0.000000	.526053	1.028258	-.001128	0.000000	.785865	.413406	1.016099
2	1.206385	3.673157	.493455	.525935	1.027032	-.001031	.014936	.785421	.413081	1.015617
3	1.206385	3.673157	.749406	.527678	1.026257	-.000925	.021102	.785474	.414478	1.014342
4	1.206385	3.673157	.882166	.530817	1.030508	-.001386	.020451	.786136	.417294	1.012790
5	1.206385	3.673157	.951027	.531151	1.037110	-.003042	.021967	.785643	.417295	1.011901
6	1.206385	3.673157	.986745	.530634	1.038054	-.006883	.021627	.787028	.417623	1.014080
7	1.206385	3.673157	1.005271	.526086	1.022759	-.014385	.021213	.793899	.417659	1.026461
8	1.206385	3.673157	1.014881	.513033	.968891	-.026130	.020013	.814230	.417727	1.063381
9	1.206385	3.673157	1.019865	.488416	.846324	-.037718	.017503	.855210	.417698	1.139087
10	1.206385	3.673157	1.022451	.458777	.632736	-.039059	.013224	.910536	.417733	1.243530
11	1.206385	3.673157	1.023792	.439113	.379836	-.026829	.008019	.951227	.417697	1.322068
12	1.206385	3.673157	1.024487	.432178	.195183	-.013970	.004129	.966573	.417732	1.351977
13	1.206385	3.673157	1.024848	.430271	.091665	-.006464	.001941	.970774	.417696	1.360257
14	1.206385	3.673157	1.025035	.429859	.036583	-.002555	.000775	.971786	.417731	1.362198
15	1.206385	3.673157	1.025132	.429738	0.000000	0.000000	0.000000	.971978	.417696	1.362620

J= 18 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	3.700802	0.000000	.510630	.966939	-.001141	0.000000	.809400	.413304	1.059060
2	1.206385	3.700802	.493455	.510389	.964416	-.001099	.021667	.809280	.413048	1.059104
3	1.206385	3.700802	.749406	.511595	.960473	-.000985	.032872	.810078	.414431	1.059147
4	1.206385	3.700802	.882166	.513707	.960864	-.000920	.035209	.811580	.416915	1.059364
5	1.206385	3.700802	.951027	.512731	.962472	-.001149	.037533	.812393	.416539	1.061232
6	1.206385	3.700802	.986745	.510354	.954439	-.002259	.035587	.816696	.416804	1.068838

7	1.206385	3.700802	1.005271	.503644	.924533	- .005665	.031775	.827816	.416925	1.089142
8	1.206385	3.700802	1.014881	.491417	.860383	- .012239	.026098	.848777	.417104	1.127752
9	1.206385	3.700802	1.019865	.474552	.756022	- .020184	.019756	.878987	.417125	1.184320
10	1.206385	3.700802	1.022451	.454728	.592347	- .024004	.013724	.917442	.417187	1.257413
11	1.206385	3.700802	1.023792	.438444	.371115	- .018572	.008187	.951414	.417142	1.323134
12	1.206385	3.700802	1.024487	.431980	.192193	- .009958	.004143	.965755	.417187	1.351080
13	1.206385	3.700802	1.024848	.430170	.090006	- .004634	.001921	.969713	.417142	1.358898
14	1.206385	3.700802	1.025035	.429796	.035881	- .001831	.000760	.970663	.417187	1.360704
15	1.206385	3.700802	1.025132	.429670	0.000000	0.000000	0.000000	.970843	.417142	1.361115

J= 18 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	3.708787	0.000000	.472979	.767467	- .000395	0.000000	.874095	.413428	1.179293
2	1.206385	3.708787	.493455	.472562	.762929	- .000376	.025195	.874192	.413110	1.179841
3	1.206385	3.708787	.749406	.473377	.754527	- .000321	.038386	.875659	.414517	1.181007
4	1.206385	3.708787	.882166	.475202	.749956	- .000267	.042001	.878215	.417329	1.182632
5	1.206385	3.708787	.951027	.473865	.743842	- .000370	.045976	.880606	.417288	1.187188
6	1.206385	3.708787	.986745	.470264	.718767	- .000780	.045275	.887820	.417509	1.200572
7	1.206385	3.708787	1.005271	.462584	.658724	- .001359	.040567	.902459	.417463	1.228432
8	1.206385	3.708787	1.014881	.452546	.562121	- .001271	.030826	.922740	.417583	1.267109
9	1.206385	3.708787	1.019865	.442349	.431316	.000017	.020006	.944175	.417655	1.308418
10	1.206385	3.708787	1.022451	.435270	.284995	.000674	.010494	.959669	.417715	1.338499
11	1.206385	3.708787	1.023792	.432795	.185545	- .000609	.005251	.965144	.417709	1.349210
12	1.206385	3.708787	1.024487	.431721	.108030	- .001009	.002603	.967579	.417724	1.353958
13	1.206385	3.708787	1.024848	.431228	.052784	- .000711	.001191	.968653	.417711	1.356080
14	1.206385	3.708787	1.025035	.431106	.021292	- .000323	.000450	.968959	.417724	1.356662
15	1.206385	3.708787	1.025132	.431067	0.000000	0.000000	0.000000	.969019	.417711	1.356795

J= 18 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	3.711094	0.000000	.435130	.384368	- .000002	0.000000	.949825	.413298	1.324940
2	1.206385	3.711094	.493455	.435065	.380397	- .000002	.015084	.949378	.413041	1.324394
3	1.206385	3.711094	.749406	.436391	.373548	.000006	.021622	.949665	.414425	1.323183
4	1.206385	3.711094	.882166	.438376	.369643	.000020	.023416	.951033	.416911	1.322686
5	1.206385	3.711094	.951027	.437540	.358128	.000006	.026569	.952009	.416542	1.325055
6	1.206385	3.711094	.986745	.436160	.318684	- .000044	.022590	.955658	.416820	1.331815
7	1.206385	3.711094	1.005271	.434260	.257401	- .000128	.013563	.960173	.416965	1.340447
8	1.206385	3.711094	1.014881	.432882	.215543	- .000075	.005549	.963713	.417174	1.347101
9	1.206385	3.711094	1.019865	.431562	.183266	.000165	.003831	.966733	.417205	1.352975
10	1.206385	3.711094	1.022451	.431095	.121974	.000062	.003593	.967863	.417241	1.355142
11	1.206385	3.711094	1.023792	.431903	.086025	- .000090	.002331	.965984	.417211	1.351498
12	1.206385	3.711094	1.024487	.432354	.045874	.000286	.001113	.965043	.417240	1.349619
13	1.206385	3.711094	1.024848	.432483	.021920	.000399	.000497	.964687	.417211	1.348959
14	1.206385	3.711094	1.025035	.432541	.008926	.000432	.000178	.964624	.417240	1.348798
15	1.206385	3.711094	1.025132	.432516	0.000000	0.000000	0.000000	.964614	.417211	1.348815

J= 18 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	3.711760	0.000000	.426772	.125999	- .000001	0.000000	.968731	.413428	1.361835
2	1.206385	3.711760	.493455	.426783	.124393	- .000002	.004896	.967960	.413109	1.360738
3	1.206385	3.711760	.749406	.428350	.121788	- .000000	.006428	.967702	.414515	1.358383
4	1.206385	3.711760	.882166	.430811	.120582	.000001	.006763	.968703	.417328	1.356676
5	1.206385	3.711760	.951027	.430887	.116081	- .000003	.008419	.968438	.417287	1.356209
6	1.206385	3.711760	.986745	.431165	.100830	- .000002	.006858	.968342	.417515	1.355724
7	1.206385	3.711760	1.005271	.431255	.078738	- .000002	.003326	.968088	.417492	1.355255
8	1.206385	3.711760	1.014881	.430988	.065629	- .000001	.000122	.969262	.417643	1.357361
9	1.206385	3.711760	1.019865	.430218	.060822	- .000002	.000671	.970830	.417669	1.360403
10	1.206385	3.711760	1.022451	.430754	.041633	- .000001	.000989	.969560	.417642	1.357948
11	1.206385	3.711760	1.023792	.432088	.029796	- .000001	.000170	.966631	.417670	1.352172
12	1.206385	3.711760	1.024487	.432919	.016007	- .000003	.000095	.964753	.417660	1.348507
13	1.206385	3.711760	1.024848	.433178	.008102	- .000004	.000030	.964204	.417672	1.347418
14	1.206385	3.711760	1.025035	.433227	.003447	- .000004	.000081	.964072	.417662	1.347173
15	1.206385	3.711760	1.025132	.433241	0.000000	0.000000	0.000000	.964060	.417670	1.347139

J= 18 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.206385	3.711952	0.000000	.425641	0.000000	0.000000	0.000000	.971001	.413297	1.366477
2	1.206385	3.711952	.493455	.425734	0.000000	0.000000	0.000000	.970185	.413041	1.365209
3	1.206385	3.711952	.749406	.427307	0.000000	0.000000	0.000000	.969853	.414424	1.362730

4	1.206385	3.711952	.882166	.429449	0.000000	0.000000	0.000000	.970804	.416910	1.361342
5	1.206385	3.711952	.951027	.429262	0.000000	0.000000	0.000000	.970370	.416543	1.360968
6	1.206385	3.711952	.986745	.429802	0.000000	0.000000	0.000000	.969792	.416819	1.359475
7	1.206385	3.711952	1.005271	.430307	0.000000	0.000000	0.000000	.968971	.416955	1.357686
8	1.206385	3.711952	1.014881	.430112	0.000000	0.000000	0.000000	.969898	.417165	1.359233
9	1.206385	3.711952	1.019865	.429572	0.000000	0.000000	0.000000	.971386	.417280	1.362001
10	1.206385	3.711952	1.022451	.430357	0.000000	0.000000	0.000000	.969877	.417393	1.358893
11	1.206385	3.711952	1.023792	.431592	0.000000	0.000000	0.000000	.966768	.417249	1.352985
12	1.206385	3.711952	1.024487	.432475	0.000000	0.000000	0.000000	.964755	.417233	1.349065
13	1.206385	3.711952	1.024848	.432684	0.000000	0.000000	0.000000	.964217	.417201	1.348051
14	1.206385	3.711952	1.025035	.432913	0.000000	0.000000	0.000000	.964273	.417446	1.347844
15	1.206385	3.711952	1.025132	.433077	0.000000	0.000000	0.000000	.964166	.417558	1.347491

J= 19 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	0.000000	0.000000	.508572	1.075137	0.000000	0.000000	.765722	.389424	1.003529
2	1.809577	0.000000	.499612	.509019	1.074449	0.000000	.009159	.765708	.389760	1.003158
3	1.809577	0.000000	.758757	.510306	1.074943	0.000000	.014047	.765691	.390737	1.002124
4	1.809577	0.000000	.893173	.511193	1.079728	0.000000	.017335	.764937	.391031	1.000442
5	1.809577	0.000000	.962893	.511602	1.087755	0.000000	.020132	.763328	.390520	.998018
6	1.809577	0.000000	.999057	.512522	1.094781	0.000000	.020977	.762642	.390870	.996404
7	1.809577	0.000000	1.017814	.509327	1.088521	0.000000	.021584	.766776	.390540	1.004315
8	1.809577	0.000000	1.027544	.495692	1.038209	0.000000	.020912	.788484	.390845	1.044018
9	1.809577	0.000000	1.032590	.464920	.895203	0.000000	.018396	.840002	.390533	1.141114
10	1.809577	0.000000	1.035208	.430391	.639939	0.000000	.013389	.908103	.390839	1.272301
11	1.809577	0.000000	1.036566	.410993	.368297	0.000000	.007777	.950211	.390530	1.356083
12	1.809577	0.000000	1.037270	.405251	.186978	0.000000	.003953	.964433	.390837	1.384147
13	1.809577	0.000000	1.037635	.403343	.087724	0.000000	.001858	.968231	.390529	1.392225
14	1.809577	0.000000	1.037825	.403276	.035029	0.000000	.000742	.969155	.390837	1.393646
15	1.809577	0.000000	1.037923	.402885	0.000000	0.000000	0.000000	.969330	.390529	1.394438

J= 19 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	1.670379	0.000000	.509084	1.074347	.000129	0.000000	.766090	.390004	1.003607
2	1.809577	1.670379	.499612	.509517	1.073686	.000068	.009032	.766056	.390319	1.003222
3	1.809577	1.670379	.758757	.510763	1.074240	-.000056	.013916	.765981	.391234	1.002144
4	1.809577	1.670379	.893173	.511628	1.079095	-.000124	.017247	.765160	.391478	1.000393
5	1.809577	1.670379	.962893	.512056	1.087169	-.000061	.020048	.763519	.390965	.997914
6	1.809577	1.670379	.999057	.512940	1.094049	.000062	.020913	.762877	.391310	.996386
7	1.809577	1.670379	1.017814	.509591	1.087153	-.000032	.021529	.767246	.390982	1.004723
8	1.809577	1.670379	1.027544	.495688	1.035560	-.000690	.020850	.789376	.391284	1.045203
9	1.809577	1.670379	1.032590	.464813	.891149	-.001936	.018315	.841144	.390975	1.142771
10	1.809577	1.670379	1.035208	.430536	.635934	-.002901	.013306	.908816	.391278	1.273128
11	1.809577	1.670379	1.036566	.411376	.365871	-.002516	.007726	.950400	.390971	1.355848
12	1.809577	1.670379	1.037270	.405704	.185802	-.001486	.003928	.964439	.391276	1.383538
13	1.809577	1.670379	1.037635	.403815	.087189	-.000726	.001847	.968192	.390970	1.391518
14	1.809577	1.670379	1.037825	.403750	.034818	-.000294	.000738	.969105	.391276	1.392920
15	1.809577	1.670379	1.037923	.403362	0.000000	0.000000	0.000000	.969278	.390970	1.393704

J= 19 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	3.246102	0.000000	.510285	1.072440	-.000975	0.000000	.767130	.391455	1.004023
2	1.809577	3.246102	.499612	.510730	1.071848	-.001138	.008778	.767075	.391769	1.003601
3	1.809577	3.246102	.758757	.512007	1.072550	-.001604	.013514	.766933	.392675	1.002414
4	1.809577	3.246102	.893173	.512903	1.077547	-.002250	.016831	.766010	.392889	1.000507
5	1.809577	3.246102	.962893	.513314	1.085590	-.002926	.019707	.764325	.392338	.997986
6	1.809577	3.246102	.999057	.513995	1.091710	-.003824	.020662	.763935	.392658	.996949
7	1.809577	3.246102	1.017814	.510091	1.082545	-.005537	.021329	.769127	.392325	1.006790
8	1.809577	3.246102	1.027544	.495459	1.027181	-.008372	.020643	.792439	.392621	1.049451
9	1.809577	3.246102	1.032590	.464520	.879590	-.011327	.018076	.844559	.392315	1.147699
10	1.809577	3.246102	1.035208	.431088	.625785	-.011685	.013094	.910751	.392614	1.275186
11	1.809577	3.246102	1.036566	.412534	.360310	-.008434	.007608	.950980	.392311	1.355150
12	1.809577	3.246102	1.037270	.407018	.183241	-.004687	.003873	.964607	.392613	1.381991
13	1.809577	3.246102	1.037635	.405169	.086040	-.002263	.001822	.968264	.392310	1.389759
14	1.809577	3.246102	1.037825	.405108	.034367	-.000913	.000728	.969155	.392612	1.391122
15	1.809577	3.246102	1.037923	.404726	0.000000	0.000000	0.000000	.969324	.392310	1.391889

J= 19 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT

1	1.809577	3.577180	0.000000	.510299	1.067716	-.002215	0.000000	.769417	.392632	1.007005
2	1.809577	3.577180	.499612	.510763	1.067133	-.002315	.009367	.769363	.392962	1.006568
3	1.809577	3.577180	.758757	.512223	1.067840	-.002831	.014001	.769302	.394054	1.005340
4	1.809577	3.577180	.893173	.513438	1.072717	-.003992	.016683	.768580	.394618	1.003445
5	1.809577	3.577180	.962893	.513854	1.080064	-.005714	.019209	.767222	.394240	1.001348
6	1.809577	3.577180	.999057	.513997	1.083908	-.008412	.020118	.767696	.394593	1.001855
7	1.809577	3.577180	1.017814	.509078	1.070139	-.013006	.020806	.774525	.394294	1.014663
8	1.809577	3.577180	1.027544	.493735	1.009530	-.019257	.020170	.799166	.394577	1.059838
9	1.809577	3.577180	1.032590	.463793	.861236	-.024141	.017670	.850137	.394287	1.156003
10	1.809577	3.577180	1.035208	.432141	.614543	-.022559	.012857	.913058	.394570	1.277169
11	1.809577	3.577180	1.036566	.414304	.356264	-.015043	.007526	.951678	.394284	1.353825
12	1.809577	3.577180	1.037270	.408873	.181863	-.008118	.003848	.965015	.394569	1.380063
13	1.809577	3.577180	1.037635	.407055	.085491	-.003924	.001812	.968624	.394283	1.387695
14	1.809577	3.577180	1.037825	.406979	.034160	-.001592	.000724	.969504	.394568	1.389059
15	1.809577	3.577180	1.037923	.406615	0.000000	0.000000	0.000000	.969671	.394283	1.389796

J= 19 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	3.673002	0.000000	.504732	1.047543	-.001416	0.000000	.777498	.392428	1.022056
2	1.809577	3.673002	.499612	.505077	1.046686	-.001321	.012117	.777444	.392669	1.021707
3	1.809577	3.673002	.758757	.506313	1.046664	-.001207	.018222	.777477	.393647	1.020752
4	1.809577	3.673002	.893173	.507385	1.050319	-.001533	.020784	.777159	.394319	1.019470
5	1.809577	3.673002	.962893	.507378	1.055189	-.002797	.022424	.776758	.394110	1.018951
6	1.809577	3.673002	.999057	.506378	1.053878	-.005953	.022272	.779164	.394552	1.022914
7	1.809577	3.673002	1.017814	.500043	1.032233	-.011964	.021825	.788561	.394314	1.040477
8	1.809577	3.673002	1.027544	.485035	.966438	-.019902	.020293	.813563	.394607	1.086631
9	1.809577	3.673002	1.032590	.458956	.825924	-.025392	.017346	.859191	.394331	1.173224
10	1.809577	3.673002	1.035208	.431309	.598926	-.022604	.012650	.914904	.394606	1.280738
11	1.809577	3.673002	1.036566	.414583	.352522	-.013559	.007481	.951143	.394328	1.352698
12	1.809577	3.673002	1.037270	.409260	.180777	-.006472	.003832	.964188	.394604	1.378358
13	1.809577	3.673002	1.037635	.407471	.085017	-.002865	.001803	.967744	.394327	1.385868
14	1.809577	3.673002	1.037825	.407391	.033975	-.001107	.000720	.968611	.394604	1.387218
15	1.809577	3.673002	1.037923	.407036	0.000000	0.000000	0.000000	.968776	.394327	1.387938

J= 19 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	3.700736	0.000000	.485277	.966027	-.001146	0.000000	.808869	.392525	1.080146
2	1.809577	3.700736	.499612	.485604	.964557	-.001105	.016052	.808944	.392826	1.079955
3	1.809577	3.700736	.758757	.486613	.962822	-.001009	.025273	.809308	.393820	1.079544
4	1.809577	3.700736	.893173	.486989	.963391	-.000981	.029919	.809612	.394272	1.079616
5	1.809577	3.700736	.962893	.485688	.962384	-.001180	.032183	.810764	.393778	1.082310
6	1.809577	3.700736	.999057	.482741	.950188	-.002016	.030707	.816402	.394111	1.092492
7	1.809577	3.700736	1.017814	.474768	.912820	-.004442	.027280	.829659	.393896	1.117653
8	1.809577	3.700736	1.027544	.461598	.836462	-.008412	.022253	.854039	.394223	1.163515
9	1.809577	3.700736	1.032590	.443501	.710099	-.011435	.016865	.888309	.393966	1.229720
10	1.809577	3.700736	1.035208	.425510	.527359	-.010452	.011655	.926516	.394242	1.304034
11	1.809577	3.700736	1.036566	.413289	.320995	-.006048	.006920	.953248	.393967	1.357389
12	1.809577	3.700736	1.037270	.409037	.167277	-.002624	.003566	.963826	.394240	1.378141
13	1.809577	3.700736	1.037635	.407490	.078955	-.001072	.001678	.966811	.393966	1.384506
14	1.809577	3.700736	1.037825	.407463	.031583	-.000395	.000669	.967548	.394240	1.385598
15	1.809577	3.700736	1.037923	.407121	0.000000	0.000000	0.000000	.967688	.393966	1.386264

J= 19 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	3.708762	0.000000	.445300	.736580	-.000292	0.000000	.881322	.392452	1.218073
2	1.809577	3.708762	.499612	.445614	.734878	-.000281	.015815	.881253	.392699	1.217635
3	1.809577	3.708762	.758757	.446645	.732384	-.000252	.025095	.881433	.393687	1.216759
4	1.809577	3.708762	.893173	.447128	.730494	-.000238	.030231	.881992	.394364	1.217003
5	1.809577	3.708762	.962893	.445780	.722713	-.000295	.033149	.884129	.394127	1.221426
6	1.809577	3.708762	.999057	.442637	.696795	-.000455	.032281	.891200	.394479	1.234685
7	1.809577	3.708762	1.017814	.435760	.638665	-.000725	.028155	.904551	.394167	1.261055
8	1.809577	3.708762	1.027544	.427256	.544530	-.000870	.020673	.923275	.394475	1.297346
9	1.809577	3.708762	1.032590	.419006	.428921	-.000940	.013276	.940852	.394223	1.332395
10	1.809577	3.708762	1.035208	.414140	.322408	-.001213	.008050	.952584	.394503	1.355329
11	1.809577	3.708762	1.036566	.410731	.221715	-.001168	.004967	.959823	.394229	1.370150
12	1.809577	3.708762	1.037270	.409146	.125364	-.000751	.002706	.964209	.394502	1.378542
13	1.809577	3.708762	1.037635	.408205	.060642	-.000447	.001298	.965761	.394228	1.382033
14	1.809577	3.708762	1.037825	.408312	.024420	-.000200	.000517	.966177	.394502	1.382483

	15	1.809577	3.708762	1.037923	.407995	0.000000	0.000000	0.000000	.966257	.394228	1.383027

J= 19 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	3.711085	0.000000	.412043	.352680	.000009	0.000000	.952616	.392519	1.358128
2	1.809577	3.711085	.499612	.412496	.352112	.000009	.007648	.952302	.392821	1.357085
3	1.809577	3.711085	.758757	.413715	.351819	.000011	.012109	.951898	.393815	1.354908
4	1.809577	3.711085	.893173	.414348	.350791	.000013	.015669	.951540	.394269	1.353570
5	1.809577	3.711085	.962893	.413738	.341872	.000007	.017708	.951759	.393779	1.354680
6	1.809577	3.711085	.999057	.413119	.318547	-.000010	.015807	.954009	.394119	1.358697
7	1.809577	3.711085	1.017814	.411657	.281097	-.000048	.011968	.956907	.393917	1.364758
8	1.809577	3.711085	1.027544	.410576	.234328	-.000052	.008041	.960258	.394259	1.370977
9	1.809577	3.711085	1.032590	.409386	.180538	-.000074	.005729	.962432	.394006	1.375678
10	1.809577	3.711085	1.035208	.409372	.138489	-.000135	.003774	.963127	.394277	1.376691
11	1.809577	3.711085	1.036566	.409235	.104211	-.000019	.002490	.962794	.394009	1.376398
12	1.809577	3.711085	1.037270	.409393	.062365	-.000017	.001378	.963072	.394275	1.376583
13	1.809577	3.711085	1.037635	.409047	.031052	-.000021	.000676	.963235	.394008	1.377281
14	1.809577	3.711085	1.037825	.409294	.012687	.000070	.000248	.963304	.394274	1.377049
15	1.809577	3.711085	1.037923	.409013	0.000000	0.000000	0.000000	.963318	.394009	1.377447

J= 19 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	3.711758	0.000000	.405219	.114375	.000000	0.000000	.968494	.392452	1.390021
2	1.809577	3.711758	.499612	.405618	.114236	.000000	.002276	.968147	.392698	1.388975
3	1.809577	3.711758	.758757	.406816	.114359	-.000000	.003511	.967725	.393686	1.386732
4	1.809577	3.711758	.893173	.407724	.114187	-.000001	.004799	.967231	.394363	1.384790
5	1.809577	3.711758	.962893	.407763	.110906	-.000002	.005583	.966562	.394129	1.383778
6	1.809577	3.711758	.999057	.408084	.102688	-.000001	.004927	.966677	.394485	1.383509
7	1.809577	3.711758	1.017814	.407812	.090361	-.000002	.003629	.966579	.394183	1.383736
8	1.809577	3.711758	1.027544	.408016	.075961	-.000001	.002281	.966866	.394496	1.383871
9	1.809577	3.711758	1.032590	.408018	.059167	-.000001	.001873	.966198	.394226	1.382912
10	1.809577	3.711758	1.035208	.408744	.046230	-.000000	.001028	.965128	.394491	1.380398
11	1.809577	3.711758	1.036566	.409134	.036052	-.000002	.000754	.963593	.394239	1.377676
12	1.809577	3.711758	1.037270	.409687	.022272	-.000001	.000490	.962911	.394492	1.375959
13	1.809577	3.711758	1.037635	.409512	.011575	-.000003	.000221	.962702	.394238	1.375895
14	1.809577	3.711758	1.037825	.409792	.004889	-.000002	.000114	.962664	.394493	1.375464
15	1.809577	3.711758	1.037923	.409529	0.000000	0.000000	0.000000	.962660	.394237	1.375812

J= 19 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.809577	3.711952	0.000000	.404502	0.000000	0.000000	0.000000	.970375	.392519	1.393706
2	1.809577	3.711952	.499612	.404958	0.000000	0.000000	0.000000	.970028	.392820	1.392580
3	1.809577	3.711952	.758757	.406157	0.000000	0.000000	0.000000	.969611	.393814	1.390336
4	1.809577	3.711952	.893173	.406840	0.000000	0.000000	0.000000	.969103	.394269	1.388675
5	1.809577	3.711952	.962893	.406665	0.000000	0.000000	0.000000	.968320	.393782	1.387793
6	1.809577	3.711952	.999057	.407076	0.000000	0.000000	0.000000	.968182	.394124	1.387032
7	1.809577	3.711952	1.017814	.407053	0.000000	0.000000	0.000000	.967742	.393922	1.386435
8	1.809577	3.711952	1.027544	.407429	0.000000	0.000000	0.000000	.967685	.394263	1.385840
9	1.809577	3.711952	1.032590	.407591	0.000000	0.000000	0.000000	.966694	.394016	1.384200
10	1.809577	3.711952	1.035208	.408389	0.000000	0.000000	0.000000	.965422	.394268	1.381298
11	1.809577	3.711952	1.036566	.408798	0.000000	0.000000	0.000000	.963726	.393969	1.378320
12	1.809577	3.711952	1.037270	.409431	0.000000	0.000000	0.000000	.962923	.394250	1.376320
13	1.809577	3.711952	1.037635	.409277	0.000000	0.000000	0.000000	.962661	.393995	1.376153
14	1.809577	3.711952	1.037825	.409614	0.000000	0.000000	0.000000	.962679	.394327	1.375724
15	1.809577	3.711952	1.037923	.409571	0.000000	0.000000	0.000000	.962669	.394282	1.375768

J= 20 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	0.000000	0.000000	.492294	1.098152	0.000000	0.000000	.755795	.372073	1.003493
2	2.366370	0.000000	.505295	.492064	1.098574	0.000000	.008962	.755398	.371704	1.003154
3	2.366370	0.000000	.767388	.491765	1.100839	0.000000	.015358	.754375	.370975	1.002039
4	2.366370	0.000000	.903333	.492161	1.106212	0.000000	.019014	.752968	.370581	.999847
5	2.366370	0.000000	.973847	.493232	1.114420	0.000000	.020714	.751250	.370540	.996700
6	2.366370	0.000000	1.010422	.493526	1.120419	0.000000	.021738	.750856	.370567	.995939
7	2.366370	0.000000	1.029393	.488649	1.107488	0.000000	.022049	.758200	.370494	1.009684
8	2.366370	0.000000	1.039233	.471449	1.042230	0.000000	.021129	.785981	.370550	1.061789
9	2.366370	0.000000	1.044337	.439269	.880100	0.000000	.018144	.843409	.370483	1.172049
10	2.366370	0.000000	1.046984	.406633	.615145	0.000000	.012902	.911252	.370545	1.306044
11	2.366370	0.000000	1.048357	.389838	.348966	0.000000	.007370	.950344	.370480	1.385248

12	2.366370	0.000000	1.049070	.384759	.176061	0.000000	.003725	.963053	.370544	1.411154
13	2.366370	0.000000	1.049439	.383343	.082369	0.000000	.001745	.966444	.370480	1.418214
14	2.366370	0.000000	1.049631	.383087	.032846	0.000000	.000695	.967256	.370543	1.419784
15	2.366370	0.000000	1.049730	.382960	0.000000	0.000000	0.000000	.967410	.370479	1.420199

J= 20 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	1.670379	0.000000	.492790	1.097879	- .000649	0.000000	.756008	.372553	1.003371
2	2.366370	1.670379	.505295	.492560	1.098315	- .000728	.008871	.755599	.372178	1.003016
3	2.366370	1.670379	.767388	.492255	1.100616	- .000925	.015245	.754538	.371425	1.001855
4	2.366370	1.670379	.903333	.492646	1.106034	- .001143	.018929	.753081	.371003	.999603
5	2.366370	1.670379	.973847	.493713	1.114219	- .001324	.020652	.751355	.370953	.996449
6	2.366370	1.670379	1.010422	.493941	1.119937	- .001559	.021694	.751059	.370979	.995873
7	2.366370	1.670379	1.029393	.488887	1.106280	- .002101	.022011	.758669	.370903	1.010110
8	2.366370	1.670379	1.039233	.471482	1.039920	- .003133	.021081	.786796	.370960	1.062859
9	2.366370	1.670379	1.044337	.439294	.876961	- .004332	.018083	.844292	.370893	1.173250
10	2.366370	1.670379	1.046984	.406875	.612481	- .004594	.012847	.911718	.370955	1.306399
11	2.366370	1.670379	1.048357	.390220	.347528	- .003362	.007340	.950465	.370890	1.384881
12	2.366370	1.670379	1.049070	.385178	.175397	- .001865	.003711	.963072	.370954	1.410569
13	2.366370	1.670379	1.049439	.383769	.082070	- .000895	.001738	.966440	.370889	1.417578
14	2.366370	1.670379	1.049631	.383515	.032728	- .000360	.000694	.967246	.370954	1.419135
15	2.366370	1.670379	1.049730	.383388	0.000000	0.000000	0.000000	.967399	.370889	1.419549

J= 20 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	3.246102	0.000000	.493760	1.096519	- .001851	0.000000	.756924	.373739	1.003797
2	2.366370	3.246102	.505295	.493563	1.096985	- .002011	.008747	.756511	.373385	1.003409
3	2.366370	3.246102	.767388	.493344	1.099349	- .002495	.014974	.755435	.372689	1.002160
4	2.366370	3.246102	.903333	.493784	1.104777	- .003233	.018611	.753952	.372289	.999837
5	2.366370	3.246102	.973847	.494763	1.112639	- .004136	.020414	.752300	.372210	.996855
6	2.366370	3.246102	1.010422	.494700	1.117174	- .005425	.021512	.752428	.372226	.997075
7	2.366370	3.246102	1.029393	.489092	1.101123	- .007507	.021854	.760888	.372144	1.012895
8	2.366370	3.246102	1.039233	.471226	1.031761	- .010300	.020905	.789857	.372201	1.067227
9	2.366370	3.246102	1.044337	.439281	.867338	- .012439	.017890	.847139	.372132	1.177220
10	2.366370	3.246102	1.046984	.407616	.605265	- .011593	.012697	.913106	.372196	1.307436
11	2.366370	3.246102	1.048357	.391345	.344020	- .007836	.007266	.950899	.372129	1.383919
12	2.366370	3.246102	1.049070	.386390	.173867	- .004241	.003679	.963263	.372195	1.409077
13	2.366370	3.246102	1.049439	.384997	.081394	- .002032	.001724	.966576	.372129	1.415966
14	2.366370	3.246102	1.049631	.384749	.032464	- .000818	.000688	.967369	.372195	1.417494
15	2.366370	3.246102	1.049730	.384621	0.000000	0.000000	0.000000	.967521	.372128	1.417905

J= 20 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	3.576934	0.000000	.492721	1.089414	- .002486	0.000000	.760204	.374569	1.008996
2	2.366370	3.576934	.505295	.492546	1.089853	- .002584	.009375	.759797	.374235	1.008599
3	2.366370	3.576934	.767388	.492473	1.092103	- .003059	.015587	.758825	.373701	1.007369
4	2.366370	3.576934	.903333	.493077	1.097102	- .004095	.018741	.757628	.373569	1.005286
5	2.366370	3.576934	.973847	.493841	1.103611	- .005690	.020249	.756531	.373606	1.003210
6	2.366370	3.576934	1.010422	.493082	1.105096	- .008278	.021211	.757806	.373660	1.005519
7	2.366370	3.576934	1.029393	.486564	1.084391	- .012313	.021484	.767828	.373597	1.024254
8	2.366370	3.576934	1.039233	.468558	1.011080	- .016981	.020504	.797451	.373652	1.079938
9	2.366370	3.576934	1.044337	.438092	.847803	- .019467	.017520	.852766	.373590	1.186326
10	2.366370	3.576934	1.046984	.408237	.593453	- .016671	.012468	.915273	.373648	1.309742
11	2.366370	3.576934	1.048357	.392651	.339274	- .010460	.007175	.951447	.373587	1.382872
12	2.366370	3.576934	1.049070	.387813	.171983	- .005492	.003643	.963471	.373647	1.407310
13	2.366370	3.576934	1.049439	.386450	.080588	- .002630	.001708	.966713	.373586	1.414034
14	2.366370	3.576934	1.049631	.386202	.032154	- .001063	.000682	.967490	.373647	1.415536
15	2.366370	3.576934	1.049730	.386080	0.000000	0.000000	0.000000	.967639	.373586	1.415932

J= 20 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	3.672860	0.000000	.484860	1.060436	- .001418	0.000000	.771937	.374282	1.031183
2	2.366370	3.672860	.505295	.484610	1.060696	- .001371	.011442	.771514	.373883	1.030829
3	2.366370	3.672860	.767388	.484353	1.062325	- .001347	.018790	.770614	.373249	1.029845
4	2.366370	3.672860	.903333	.484659	1.065831	- .001629	.021922	.769887	.373132	1.028614
5	2.366370	3.672860	.973847	.484700	1.068952	- .002594	.022773	.770018	.373228	1.028755
6	2.366370	3.672860	1.010422	.482630	1.064118	- .005091	.022772	.773533	.373330	1.035222
7	2.366370	3.672860	1.029393	.474977	1.035220	- .009549	.022006	.785931	.373299	1.058560
8	2.366370	3.672860	1.039233	.458057	.957439	- .014489	.020234	.815095	.373360	1.113885

9	2.366370	3.672860	1.044337	.431896	.801811	-.016416	.016909	.864334	.373302	1.209288
10	2.366370	3.672860	1.046984	.406315	.566497	-.012651	.012004	.918888	.373358	1.317399
11	2.366370	3.672860	1.048357	.392334	.327292	-.006504	.006948	.951484	.373299	1.383372
12	2.366370	3.672860	1.049070	.387847	.166514	-.002704	.003532	.962639	.373357	1.406045
13	2.366370	3.672860	1.049439	.386571	.078078	-.001086	.001655	.965665	.373298	1.412326
14	2.366370	3.672860	1.049631	.386340	.031162	-.000396	.000660	.966393	.373356	1.413728
15	2.366370	3.672860	1.049730	.386225	0.000000	0.000000	0.000000	.966532	.373298	1.414100

J= 20 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	3.700674	0.000000	.462132	.960735	-.001000	0.000000	.810209	.374424	1.103293
2	2.366370	3.700674	.505295	.461931	.960794	-.000992	.013613	.809806	.374075	1.102935
3	2.366370	3.700674	.767388	.461628	.961479	-.000987	.022758	.809058	.373484	1.102206
4	2.366370	3.700674	.903333	.461417	.962231	-.001030	.027130	.808952	.373264	1.102263
5	2.366370	3.700674	.973847	.460259	.959019	-.001190	.028327	.810789	.373172	1.105877
6	2.366370	3.700674	1.010422	.456502	.942507	-.001823	.027237	.817471	.373177	1.118652
7	2.366370	3.700674	1.029393	.448047	.898191	-.003528	.024096	.832839	.373151	1.148238
8	2.366370	3.700674	1.039233	.434281	.812084	-.005810	.019848	.859398	.373220	1.199737
9	2.366370	3.700674	1.044337	.416842	.673432	-.006557	.015155	.895230	.373170	1.270416
10	2.366370	3.700674	1.046984	.400606	.482991	-.004593	.010419	.931646	.373223	1.343272
11	2.366370	3.700674	1.048357	.390989	.285544	-.001774	.006080	.954419	.373167	1.389547
12	2.366370	3.700674	1.049070	.387664	.146882	-.000427	.003116	.962744	.373221	1.406464
13	2.366370	3.700674	1.049439	.386676	.069105	-.000076	.001465	.965062	.373166	1.411291
14	2.366370	3.700674	1.049631	.386507	.027616	-.000008	.000586	.965625	.373221	1.412360
15	2.366370	3.700674	1.049730	.386408	0.000000	0.000000	0.000000	.965733	.373166	1.412663

J= 20 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	3.708739	0.000000	.421913	.711261	-.000209	0.000000	.887139	.374296	1.252860
2	2.366370	3.708739	.505295	.421726	.711443	-.000210	.012342	.886599	.373902	1.252319
3	2.366370	3.708739	.767388	.421465	.711887	-.000215	.020768	.885670	.373279	1.251317
4	2.366370	3.708739	.903333	.421310	.710479	-.000224	.024832	.885742	.373172	1.251603
5	2.366370	3.708739	.973847	.420261	.701321	-.000252	.026007	.888134	.373248	1.256235
6	2.366370	3.708739	1.010422	.417080	.673596	-.000355	.025141	.895004	.373288	1.269806
7	2.366370	3.708739	1.029393	.411048	.614600	-.000568	.021408	.907943	.373208	1.295691
8	2.366370	3.708739	1.039233	.403665	.524612	-.000734	.015658	.924717	.373276	1.329231
9	2.366370	3.708739	1.044337	.397084	.420564	-.000747	.010412	.939912	.373224	1.359987
10	2.366370	3.708739	1.046984	.392259	.312919	-.000644	.006856	.951626	.373284	1.383685
11	2.366370	3.708739	1.048357	.388871	.198929	-.000497	.004208	.959761	.373223	1.400364
12	2.366370	3.708739	1.049070	.387428	.106575	-.000411	.002245	.963487	.373282	1.407891
13	2.366370	3.708739	1.049439	.386905	.050845	-.000270	.001075	.964635	.373222	1.410332
14	2.366370	3.708739	1.049631	.386850	.020423	-.000124	.000432	.964926	.373282	1.410836
15	2.366370	3.708739	1.049730	.386766	0.000000	0.000000	0.000000	.964982	.373222	1.411043

J= 20 K= 8

L	X	Y	Z	R/RREF	U/AREF	W/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	3.711078	0.000000	.392373	.331350	.000015	0.000000	.954241	.374419	1.387325
2	2.366370	3.711078	.505295	.392230	.331798	.000014	.006268	.953701	.374070	1.386744
3	2.366370	3.711078	.767388	.392037	.332591	.000010	.010676	.952663	.373479	1.385507
4	2.366370	3.711078	.903333	.392037	.331318	.000010	.012908	.952104	.373260	1.384692
5	2.366370	3.711078	.973847	.391811	.323572	.000008	.013412	.952427	.373172	1.385482
6	2.366370	3.711078	1.010422	.391161	.303796	-.000004	.012400	.954038	.373183	1.388748
7	2.366370	3.711078	1.029393	.390072	.268252	-.000034	.009713	.956655	.373165	1.394111
8	2.366370	3.711078	1.039233	.389088	.221953	-.000053	.006770	.959270	.373241	1.399335
9	2.366370	3.711078	1.044337	.388388	.175551	-.000080	.004625	.960877	.373193	1.402689
10	2.366370	3.711078	1.046984	.388003	.135508	-.000054	.003171	.961961	.373244	1.404828
11	2.366370	3.711078	1.048357	.387552	.092597	.000059	.002097	.962941	.373190	1.406915
12	2.366370	3.711078	1.049070	.387351	.052746	-.000090	.001138	.963574	.373242	1.408131
13	2.366370	3.711078	1.049439	.387201	.025941	-.000121	.000560	.963814	.373189	1.408701
14	2.366370	3.711078	1.049631	.387227	.010571	-.000021	.000201	.963882	.373241	1.408763
15	2.366370	3.711078	1.049730	.387168	0.000000	0.000000	0.000000	.963896	.373190	1.408869

J= 20 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	3.711756	0.000000	.386593	.106836	.000000	0.000000	.968189	.374295	1.415984
2	2.366370	3.711756	.505295	.386392	.107048	-.000000	.002082	.967675	.373902	1.415529
3	2.366370	3.711756	.767388	.386148	.107435	-.000001	.003525	.966674	.373279	1.414421
4	2.366370	3.711756	.903333	.386315	.107036	-.000001	.004155	.965978	.373172	1.413157
5	2.366370	3.711756	.973847	.386546	.104333	-.000001	.004234	.965604	.373250	1.412273

6	2.366370	3.711756	1.010422	.386624	.097675	-.000001	.003981	.965524	.373294	1.412042
7	2.366370	3.711756	1.029393	.386576	.086087	-.000001	.003095	.965446	.373218	1.411998
8	2.366370	3.711756	1.039233	.386769	.071413	-.000001	.002137	.965140	.373286	1.411270
9	2.366370	3.711756	1.044337	.386997	.056693	-.000001	.001536	.964406	.373222	1.409863
10	2.366370	3.711756	1.046984	.387252	.044607	-.000001	.000867	.963916	.373278	1.408775
11	2.366370	3.711756	1.048357	.387296	.031661	-.000001	.000777	.963686	.373232	1.408375
12	2.366370	3.711756	1.049070	.387361	.016711	-.000001	.000482	.963635	.373275	1.408205
13	2.366370	3.711756	1.049439	.387315	.009615	-.000001	.000210	.963634	.373230	1.408271
14	2.366370	3.711756	1.049631	.387359	.004049	-.000001	.000097	.963642	.373275	1.408220
15	2.366370	3.711756	1.049730	.387311	0.000000	0.000000	0.000000	.963641	.373229	1.408298

J= 20 K= 10

I	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.366370	3.711952	0.000000	.386067	0.000000	0.000000	0.000000	.969828	.374419	1.419154
2	2.366370	3.711952	.505295	.385909	0.000000	0.000000	0.000000	.969321	.374070	1.418644
3	2.366370	3.711952	.767388	.385694	0.000000	0.000000	0.000000	.968330	.373479	1.417511
4	2.366370	3.711952	.903333	.385752	0.000000	0.000000	0.000000	.967620	.373261	1.416386
5	2.366370	3.711952	.973847	.385845	0.000000	0.000000	0.000000	.967161	.373174	1.415578
6	2.366370	3.711952	1.010422	.385968	0.000000	0.000000	0.000000	.966885	.373187	1.414993
7	2.366370	3.711952	1.029393	.386104	0.000000	0.000000	0.000000	.966501	.373170	1.414232
8	2.366370	3.711952	1.039233	.386435	0.000000	0.000000	0.000000	.965860	.373242	1.412810
9	2.366370	3.711952	1.044337	.386779	0.000000	0.000000	0.000000	.964857	.373187	1.410839
10	2.366370	3.711952	1.046984	.387094	0.000000	0.000000	0.000000	.964183	.373229	1.409396
11	2.366370	3.711952	1.048357	.387194	0.000000	0.000000	0.000000	.963795	.373176	1.408682
12	2.366370	3.711952	1.049070	.387311	0.000000	0.000000	0.000000	.963662	.373237	1.408317
13	2.366370	3.711952	1.049439	.387281	0.000000	0.000000	0.000000	.963611	.373188	1.408287
14	2.366370	3.711952	1.049631	.387314	0.000000	0.000000	0.000000	.963580	.373208	1.408193
15	2.366370	3.711952	1.049730	.387313	0.000000	0.000000	0.000000	.963610	.373218	1.408241

J= 21 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	0.000000	0.000000	.476915	1.119382	0.000000	0.000000	.746095	.355824	1.003269
2	3.108760	0.000000	.512873	.476352	1.120328	0.000000	.010157	.745423	.355084	1.002840
3	3.108760	0.000000	.778896	.475740	1.123463	0.000000	.017224	.743947	.353925	1.001369
4	3.108760	0.000000	.916880	.476610	1.129429	0.000000	.020082	.742384	.353827	.998535
5	3.108760	0.000000	.988431	.477903	1.137652	0.000000	.021433	.740596	.353933	.995052
6	3.108760	0.000000	1.025575	.477407	1.141233	0.000000	.022409	.741113	.353813	.996159
7	3.108760	0.000000	1.044830	.470628	1.120763	0.000000	.022476	.751948	.353888	1.016521
8	3.108760	0.000000	1.054818	.450552	1.041767	0.000000	.021250	.785258	.353800	1.080225
9	3.108760	0.000000	1.059999	.417665	.864089	0.000000	.017885	.847280	.353879	1.201422
10	3.108760	0.000000	1.062686	.386872	.591946	0.000000	.012447	.914505	.353796	1.337086
11	3.108760	0.000000	1.064080	.372124	.331113	0.000000	.006999	.950965	.353877	1.412179
12	3.108760	0.000000	1.064802	.367617	.165869	0.000000	.003512	.962402	.353795	1.436144
13	3.108760	0.000000	1.065177	.366548	.077348	0.000000	.001638	.965429	.353877	1.442341
14	3.108760	0.000000	1.065372	.366193	.030794	0.000000	.000653	.966145	.353795	1.443971
15	3.108760	0.000000	1.065473	.366225	0.000000	0.000000	0.000000	.966281	.353876	1.444123

J= 21 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	1.670379	0.000000	.477383	1.119423	-.001264	0.000000	.746218	.356232	1.003041
2	3.108760	1.670379	.512873	.476827	1.120376	-.001361	.010083	.745540	.355494	1.002598
3	3.108760	1.670379	.778896	.476222	1.123528	-.001622	.017123	.744043	.354330	1.001092
4	3.108760	1.670379	.916880	.477082	1.129489	-.001974	.020012	.742455	.354212	.998234
5	3.108760	1.670379	.988451	.478344	1.137589	-.002387	.021391	.740695	.354307	.994817
6	3.108760	1.670379	1.025575	.477758	1.140781	-.002958	.022379	.741353	.354187	.996189
7	3.108760	1.670379	1.044830	.470812	1.119594	-.003848	.022447	.752442	.354259	1.017031
8	3.108760	1.670379	1.054818	.450607	1.039754	-.005035	.021211	.785991	.354173	1.081182
9	3.108760	1.670379	1.059999	.417771	.861698	-.005933	.017838	.847952	.354250	1.202253
10	3.108760	1.670379	1.062686	.387151	.590167	-.005487	.012410	.914810	.354170	1.337146
11	3.108760	1.670379	1.064080	.372483	.330243	-.003690	.006980	.951044	.354248	1.411750
12	3.108760	1.670379	1.064802	.367997	.165482	-.001980	.003503	.962424	.354169	1.435584
13	3.108760	1.670379	1.065177	.366929	.077176	-.000941	.001635	.965438	.354247	1.441755
14	3.108760	1.670379	1.065372	.366577	.030726	-.000377	.000651	.966151	.354169	1.443374
15	3.108760	1.670379	1.065473	.366607	0.000000	0.000000	0.000000	.966286	.354247	1.443529

J= 21 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	3.246102	0.000000	.477993	1.117873	-.002421	0.000000	.747270	.357190	1.003942
2	3.108760	3.246102	.512873	.477476	1.118835	-.002588	.010014	.746599	.356483	1.003475

3	3.108760	3.246102	.778896	.476953	1.121980	-.003095	.016936	.745122	.355388	1.001930
4	3.108760	3.246102	.916880	.477820	1.127774	-.003901	.019791	.743585	.355300	.999137
5	3.108760	3.246102	.988451	.478919	1.135220	-.004991	.021226	.742036	.355375	.996140
6	3.108760	3.246102	1.025575	.477981	1.136905	-.006558	.022235	.743243	.355256	.998543
7	3.108760	3.246102	1.044830	.470548	1.113388	-.008774	.022301	.755121	.355320	1.020880
8	3.108760	3.246102	1.054818	.450150	1.031295	-.011238	.021042	.789159	.355240	1.085980
9	3.108760	3.246102	1.059999	.417773	.852935	-.012481	.017665	.850489	.355312	1.205848
10	3.108760	3.246102	1.062686	.387853	.584287	-.010757	.012289	.915904	.355236	1.337774
11	3.108760	3.246102	1.064080	.373470	.327567	-.006894	.006925	.951373	.355309	1.410745
12	3.108760	3.246102	1.064802	.369047	.164337	-.003646	.003480	.962575	.355235	1.434175
13	3.108760	3.246102	1.065177	.367986	.076672	-.001734	.001624	.965550	.355309	1.440264
14	3.108760	3.246102	1.065372	.367642	.030530	-.000696	.000647	.966254	.355235	1.441854
15	3.108760	3.246102	1.065473	.367667	0.000000	0.000000	0.000000	.966387	.355309	1.442014

J= 21 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	3.576610	0.000000	.475642	1.107255	-.002468	0.000000	.751995	.357681	1.012285
2	3.108760	3.576610	.512873	.475138	1.108175	-.002575	.010567	.751332	.356986	1.011822
3	3.108760	3.576610	.778896	.474679	1.111104	-.003020	.017547	.749972	.355996	1.010380
4	3.108760	3.576610	.916880	.475529	1.116149	-.003937	.020076	.748797	.356074	1.008077
5	3.108760	3.576610	.988451	.476236	1.121657	-.005412	.021230	.748011	.356230	1.006421
6	3.108760	3.576610	1.025575	.474522	1.119752	-.007801	.022037	.750536	.356146	1.011274
7	3.108760	3.576610	1.044830	.466377	1.091681	-.011158	.021965	.763798	.356218	1.036296
8	3.108760	3.576610	1.054818	.446362	1.006591	-.014437	.020623	.797875	.356141	1.101691
9	3.108760	3.576610	1.059999	.415888	.830635	-.015317	.017259	.856509	.356212	1.216582
10	3.108760	3.576610	1.062686	.387919	.570526	-.012136	.012023	.918075	.356138	1.340855
11	3.108760	3.576610	1.064080	.374270	.321423	-.007134	.006804	.951745	.356209	1.410089
12	3.108760	3.576610	1.064802	.370005	.161652	-.003593	.003426	.962521	.356137	1.432609
13	3.108760	3.576610	1.065177	.368977	.075478	-.001681	.001600	.965397	.356209	1.438488
14	3.108760	3.576610	1.065372	.368642	.030064	-.000672	.000638	.966078	.356137	1.440026
15	3.108760	3.576610	1.065473	.368667	0.000000	0.000000	0.000000	.966208	.356209	1.440180

J= 21 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	3.672673	0.000000	.465523	1.069086	-.001267	0.000000	.767572	.357322	1.042180
2	3.108760	3.672673	.512873	.464962	1.069857	-.001266	.012055	.766897	.356578	1.041766
3	3.108760	3.672673	.778896	.464305	1.072134	-.001325	.019875	.765645	.355493	1.040653
4	3.108760	3.672673	.916880	.464709	1.075363	-.001584	.022415	.765055	.355528	1.039490
5	3.108760	3.672673	.988451	.464512	1.076790	-.002347	.023033	.765707	.355680	1.040552
6	3.108760	3.672673	1.025575	.461504	1.067912	-.004299	.022960	.770571	.355622	1.049886
7	3.108760	3.672673	1.044830	.452668	1.031772	-.007468	.021963	.785797	.355705	1.078943
8	3.108760	3.672673	1.054818	.434521	.943155	-.010359	.019956	.818455	.355636	1.142327
9	3.108760	3.672673	1.059999	.408871	.775758	-.010499	.016368	.869966	.355704	1.244136
10	3.108760	3.672673	1.062686	.385427	.535824	-.007007	.011358	.922699	.355633	1.351086
11	3.108760	3.672673	1.064080	.373601	.304234	-.002935	.006454	.952088	.355701	1.411608
12	3.108760	3.672673	1.064802	.369794	.153481	-.000916	.003254	.961703	.355632	1.431716
13	3.108760	3.672673	1.065177	.368875	.071720	-.000265	.001520	.964286	.355701	1.436991
14	3.108760	3.672673	1.065372	.368569	.028578	-.000072	.000605	.964898	.355632	1.438381
15	3.108760	3.672673	1.065473	.368596	0.000000	0.000000	0.000000	.965015	.355701	1.438514

J= 21 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	3.700594	0.000000	.440551	.954020	-.000874	0.000000	.811562	.357534	1.126479
2	3.108760	3.700594	.512873	.440031	.954607	-.000892	.013220	.810921	.356831	1.126122
3	3.108760	3.700594	.778896	.439317	.955910	-.000945	.021932	.809907	.355806	1.125444
4	3.108760	3.700594	.916880	.439218	.956222	-.001014	.025020	.810103	.355812	1.125818
5	3.108760	3.700594	.988451	.437944	.951007	-.001139	.025731	.812542	.355848	1.130520
6	3.108760	3.700594	1.025575	.433685	.930461	-.001622	.024721	.820224	.355719	1.145678
7	3.108760	3.700594	1.044830	.425057	.880658	-.002772	.021889	.837078	.355806	1.178656
8	3.108760	3.700594	1.054818	.411361	.787929	-.003987	.018205	.864776	.355735	1.233714
9	3.108760	3.700594	1.059999	.394897	.641810	-.003784	.013984	.901019	.355809	1.306594
10	3.108760	3.700594	1.062686	.380219	.447443	-.002005	.009524	.935604	.355734	1.377459
11	3.108760	3.700594	1.064080	.372395	.257985	-.000347	.005458	.955455	.355807	1.418432
12	3.108760	3.700594	1.064802	.369698	.131122	.000147	.002776	.962226	.355733	1.432643
13	3.108760	3.700594	1.065177	.369061	.061462	.000144	.001301	.964084	.355806	1.436400
14	3.108760	3.700594	1.065372	.368815	.024523	.000069	.000520	.964528	.355733	1.437445
15	3.108760	3.700594	1.065473	.368859	0.000000	0.000000	0.000000	.964613	.355806	1.437504

J= 21 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	3.708709	0.000000	.401085	.690748	- .000157	0.000000	.890932	.357339	1.283957
2	3.108760	3.708709	.512873	.400544	.691087	- .000164	.011680	.890285	.356598	1.283716
3	3.108760	3.708709	.778896	.399749	.691316	- .000182	.019187	.889362	.355522	1.283404
4	3.108760	3.708709	.916880	.399572	.688976	- .000189	.021422	.889861	.355563	1.284352
5	3.108760	3.708709	.988451	.398540	.678302	- .000200	.021812	.892513	.355702	1.289513
6	3.108760	3.708709	1.025575	.395431	.648659	- .000277	.020805	.899282	.355604	1.303369
7	3.108760	3.708709	1.044830	.390205	.590335	- .000425	.017496	.911460	.355656	1.328068
8	3.108760	3.708709	1.054818	.383858	.506116	- .000505	.013006	.926365	.355593	1.358669
9	3.108760	3.708709	1.059999	.378127	.406617	- .000405	.009084	.940587	.355662	1.387854
10	3.108760	3.708709	1.062686	.373300	.292154	- .000263	.006155	.952571	.355595	1.412778
11	3.108760	3.708709	1.064080	.370398	.175585	- .000254	.003659	.960209	.355660	1.428559
12	3.108760	3.708709	1.064802	.369201	.091366	- .000266	.001912	.963145	.355594	1.434785
13	3.108760	3.708709	1.065177	.368939	.043241	- .000179	.000911	.964006	.355659	1.436474
14	3.108760	3.708709	1.065372	.368790	.017328	- .000081	.000366	.964216	.355593	1.437020
15	3.108760	3.708709	1.065473	.368843	0.000000	0.000000	0.000000	.964257	.355659	1.436998

J= 21 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	3.711068	0.000000	.374598	.315335	.000016	0.000000	.954435	.357530	1.413578
2	3.108760	3.711068	.512873	.374100	.315380	.000014	.006399	.953826	.356826	1.413428
3	3.108760	3.711068	.778896	.373400	.315007	.000009	.010196	.952870	.355802	1.413070
4	3.108760	3.711068	.916880	.373443	.312796	.000010	.010780	.952775	.355808	1.412865
5	3.108760	3.711068	.988451	.373311	.305037	.000010	.010859	.953217	.355846	1.413721
6	3.108760	3.711068	1.025575	.372677	.285644	- .000002	.010054	.954505	.355722	1.416594
7	3.108760	3.711068	1.044830	.371902	.252076	- .000024	.007833	.956743	.355814	1.421099
8	3.108760	3.711068	1.054818	.371047	.211273	- .000037	.005541	.958770	.355748	1.425420
9	3.108760	3.711068	1.059999	.370474	.171023	- .000048	.003972	.960453	.355823	1.428805
10	3.108760	3.711068	1.062686	.369806	.128154	- .000003	.002860	.961977	.355745	1.432106
11	3.108760	3.711068	1.064080	.369386	.081442	.000073	.001813	.963271	.355818	1.434684
12	3.108760	3.711068	1.064802	.369091	.044413	- .000121	.000951	.963837	.355743	1.435987
13	3.108760	3.711068	1.065177	.369093	.021556	- .000154	.000464	.964035	.355818	1.436279
14	3.108760	3.711068	1.065372	.368995	.008750	- .000054	.000165	.964085	.355743	1.436505
15	3.108760	3.711068	1.065473	.369071	0.000000	0.000000	0.000000	.964095	.355819	1.436403

J= 21 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	3.711753	0.000000	.369548	.101221	- .000000	0.000000	.966962	.357339	1.439929
2	3.108760	3.711753	.512873	.369018	.101228	- .000001	.002252	.966343	.356598	1.439833
3	3.108760	3.711753	.778896	.368289	.101067	- .000002	.003487	.965331	.355521	1.439464
4	3.108760	3.711753	.916880	.368443	.100289	- .000000	.003435	.965045	.355564	1.438798
5	3.108760	3.711753	.988451	.368666	.097653	- .000001	.003443	.964843	.355705	1.438148
6	3.108760	3.711753	1.025575	.368663	.091182	- .000001	.003250	.964590	.355609	1.437775
7	3.108760	3.711753	1.044830	.368774	.080258	- .000001	.002506	.964450	.355664	1.437394
8	3.108760	3.711753	1.054818	.368857	.067377	- .000001	.001770	.964057	.355599	1.436678
9	3.108760	3.711753	1.059999	.369015	.054912	- .000000	.001304	.963806	.355659	1.436058
10	3.108760	3.711753	1.062686	.368963	.042060	- .000001	.000807	.963760	.355592	1.436070
11	3.108760	3.711753	1.064080	.368979	.027676	- .000000	.000744	.963920	.355666	1.436285
12	3.108760	3.711753	1.064802	.368881	.015598	- .000001	.000438	.963961	.355587	1.436497
13	3.108760	3.711753	1.065177	.368949	.007887	- .000000	.000184	.963991	.355664	1.436437
14	3.108760	3.711753	1.065372	.368864	.003302	- .000000	.000080	.964005	.355587	1.436590
15	3.108760	3.711753	1.065473	.368944	0.000000	0.000000	0.000000	.964004	.355663	1.436464

J= 21 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.108760	3.711952	0.000000	.369185	0.000000	0.000000	0.000000	.968429	.357530	1.442679
2	3.108760	3.711952	.512873	.368695	0.000000	0.000000	0.000000	.967810	.356826	1.442525
3	3.108760	3.711952	.778896	.368022	0.000000	0.000000	0.000000	.966794	.355802	1.442064
4	3.108760	3.711952	.916880	.368146	0.000000	0.000000	0.000000	.966486	.355808	1.441410
5	3.108760	3.711952	.988451	.368294	0.000000	0.000000	0.000000	.966207	.355848	1.440762
6	3.108760	3.711952	1.025575	.368330	0.000000	0.000000	0.000000	.965777	.355725	1.440065
7	3.108760	3.711952	1.044830	.368583	0.000000	0.000000	0.000000	.965368	.355818	1.439060
8	3.108760	3.711952	1.054818	.368765	0.000000	0.000000	0.000000	.964699	.355748	1.437779
9	3.108760	3.711952	1.059999	.369017	0.000000	0.000000	0.000000	.964231	.355818	1.436689
10	3.108760	3.711952	1.062686	.369026	0.000000	0.000000	0.000000	.963999	.355740	1.436328
11	3.108760	3.711952	1.064080	.369101	0.000000	0.000000	0.000000	.964012	.355818	1.436230
12	3.108760	3.711952	1.064802	.369035	0.000000	0.000000	0.000000	.963990	.355746	1.436302

13	3.108760	3.711952	1.065177	.369117	0.000000	0.000000	0.000000	.963978	.355820	1.436156
14	3.108760	3.711952	1.065372	.369000	0.000000	0.000000	0.000000	.963926	.355688	1.436260
15	3.108760	3.711952	1.065473	.368972	0.000000	0.000000	0.000000	.963965	.355676	1.436362

J= 22 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	0.000000	0.000000	.464229	1.137081	0.000000	0.000000	.737735	.342478	1.002784
2	3.758352	0.000000	.519504	.463752	1.138130	0.000000	.010970	.737022	.341795	1.002227
3	3.758352	0.000000	.788966	.463551	1.141566	0.000000	.018001	.735528	.340955	1.000369
4	3.758352	0.000000	.928734	.464895	1.147982	0.000000	.020403	.733909	.341190	.997012
5	3.758352	0.000000	1.001231	.466126	1.155987	0.000000	.021879	.732124	.341262	.993535
6	3.758352	0.000000	1.038834	.464971	1.156995	0.000000	.022775	.733747	.341171	.996726
7	3.758352	0.000000	1.058338	.456530	1.130123	0.000000	.022747	.747468	.341242	1.022832
8	3.758352	0.000000	1.068455	.434592	1.040780	0.000000	.021293	.785014	.341160	1.095581
9	3.758352	0.000000	1.073703	.401389	.852293	0.000000	.017693	.850136	.341235	1.224791
10	3.758352	0.000000	1.076425	.372117	.576131	0.000000	.012137	.916801	.341157	1.361456
11	3.758352	0.000000	1.077836	.358635	.319680	0.000000	.006764	.951479	.341213	1.433964
12	3.758352	0.000000	1.078569	.354570	.159719	0.000000	.003383	.962169	.341156	1.456702
13	3.758352	0.000000	1.078948	.353614	.074431	0.000000	.001577	.964987	.341233	1.462548
14	3.758352	0.000000	1.079145	.353290	.029625	0.000000	.000628	.965653	.341156	1.464092
15	3.758352	0.000000	1.079248	.353324	0.000000	0.000000	0.000000	.965779	.341233	1.464228

J= 22 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	1.670379	0.000000	.464663	1.137200	-.001669	0.000000	.737851	.342852	1.002567
2	3.758352	1.670379	.519504	.464193	1.138252	-.001777	.010909	.737136	.342174	1.002001
3	3.758352	1.670379	.788966	.463999	1.141687	-.002080	.017917	.735633	.341333	1.000126
4	3.758352	1.670379	.928734	.465322	1.148046	-.002526	.020348	.734012	.341552	.996786
5	3.758352	1.670379	1.001231	.466502	1.155842	-.003113	.021849	.732290	.341615	.993441
6	3.758352	1.670379	1.038834	.465241	1.156389	-.003919	.022751	.734080	.341524	.996948
7	3.758352	1.670379	1.058338	.456652	1.128833	-.005010	.022720	.748035	.341592	1.023499
8	3.758352	1.670379	1.068455	.434641	1.038833	-.006194	.021256	.785736	.341513	1.096539
9	3.758352	1.670379	1.073703	.401525	.850202	-.006756	.017652	.850720	.341585	1.225467
10	3.758352	1.670379	1.076425	.372401	.574695	-.005796	.012107	.917048	.341509	1.361406
11	3.758352	1.670379	1.077836	.358976	.318994	-.003713	.006749	.951548	.341583	1.433522
12	3.758352	1.670379	1.078569	.354926	.159409	-.001957	.003377	.962196	.341508	1.456158
13	3.758352	1.670379	1.078948	.353970	.074291	-.000926	.001574	.965005	.341583	1.461984
14	3.758352	1.670379	1.079145	.353650	.029570	-.000371	.000627	.965668	.341508	1.463519
15	3.758352	1.670379	1.079248	.353681	0.000000	0.000000	0.000000	.965794	.341583	1.463659

J= 22 K= 3

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	3.246102	0.000000	.464930	1.134986	-.002750	0.000000	.739220	.343685	1.004197
2	3.758352	3.246102	.519504	.464490	1.136035	-.002919	.010875	.738515	.343033	1.003619
3	3.758352	3.246102	.788966	.464347	1.139404	-.003433	.017801	.737057	.342250	1.001760
4	3.758352	3.246102	.928734	.465631	1.145432	-.004282	.020203	.735556	.342497	.998617
5	3.758352	3.246102	1.001231	.466593	1.152310	-.005499	.021724	.734156	.342552	.995893
6	3.758352	3.246102	1.038834	.464947	1.151144	-.007224	.022622	.736566	.342464	1.000577
7	3.758352	3.246102	1.058338	.455954	1.121349	-.009436	.022569	.751232	.342527	1.028503
8	3.758352	3.246102	1.068455	.433947	1.029589	-.011534	.021078	.789156	.342452	1.102017
9	3.758352	3.246102	1.073703	.401440	.841320	-.012085	.017477	.853230	.342520	1.229187
10	3.758352	3.246102	1.076425	.373010	.568944	-.009840	.011988	.918067	.342448	1.362028
11	3.758352	3.246102	1.077836	.359847	.316332	-.006060	.006694	.951843	.342518	1.432578
12	3.758352	3.246102	1.078569	.355856	.158229	-.003149	.003352	.962321	.342448	1.454823
13	3.758352	3.246102	1.078948	.354908	.073762	-.001489	.001563	.965089	.342518	1.460566
14	3.758352	3.246102	1.079145	.354595	.029362	-.000597	.000623	.965743	.342447	1.462073
15	3.758352	3.246102	1.079248	.354622	0.000000	0.000000	0.000000	.965868	.342518	1.462216

J= 22 K= 4

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	3.576329	0.000000	.461483	1.120945	-.002410	0.000000	.745402	.343991	1.015613
2	3.758352	3.576329	.519504	.461039	1.121934	-.002517	.011355	.744709	.343340	1.015060
3	3.758352	3.576329	.788966	.460876	1.124985	-.002922	.018388	.743382	.342607	1.013395
4	3.758352	3.576329	.928734	.462002	1.129999	-.003746	.020560	.742317	.342952	1.010956
5	3.758352	3.576329	1.001231	.462459	1.134528	-.005134	.021796	.741827	.343065	1.009888
6	3.758352	3.576329	1.038834	.460022	1.129470	-.007337	.022453	.745626	.343004	1.017208
7	3.758352	3.576329	1.058338	.450528	1.095255	-.010158	.022214	.761485	.343071	1.047545
8	3.758352	3.576329	1.068455	.429312	1.001134	-.012491	.020611	.798955	.343001	1.120504
9	3.758352	3.576329	1.073703	.399032	.816131	-.012461	.017016	.859745	.343066	1.241557

10	3.758352	3.576329	1.076425	.372681	.553039	-.009243	.011676	.920353	.342998	1.365903
11	3.758352	3.576329	1.077836	.360309	.308734	-.005095	.006542	.952140	.343064	1.432290
12	3.758352	3.576329	1.078569	.356504	.154739	-.002442	.003281	.962113	.342997	1.453450
13	3.758352	3.576329	1.078948	.355596	.072182	-.001109	.001531	.964758	.343064	1.458935
14	3.758352	3.576329	1.079145	.355296	.028742	-.000437	.000610	.965384	.342997	1.460374
15	3.758352	3.576329	1.079248	.355321	0.000000	0.000000	0.000000	.965503	.343063	1.460512

J= 22 K= 5

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	3.672510	0.000000	.449689	1.075301	-.001193	0.000000	.764175	.343641	1.052030
2	3.758352	3.672510	.519504	.449183	1.076108	-.001216	.012453	.763495	.342949	1.051567
3	3.758352	3.672510	.788966	.448776	1.078372	-.001311	.020118	.762353	.342126	1.050375
4	3.758352	3.672510	.928734	.449342	1.081260	-.001539	.022304	.761994	.342396	1.049350
5	3.758352	3.672510	1.001231	.448810	1.081260	-.002172	.023067	.763072	.342474	1.051333
6	3.758352	3.672510	1.038834	.445186	1.068974	-.003744	.022905	.769170	.342425	1.063176
7	3.758352	3.672510	1.058338	.435452	1.027084	-.006061	.021829	.786521	.342493	1.096817
8	3.758352	3.672510	1.068455	.416740	.930467	-.007770	.019659	.821685	.342429	1.166163
9	3.758352	3.672510	1.073703	.391672	.755182	-.007144	.015931	.874429	.342489	1.272200
10	3.758352	3.672510	1.076425	.369957	.513485	-.004134	.010883	.925582	.342426	1.377699
11	3.758352	3.672510	1.077836	.359481	.288415	-.001285	.006118	.952726	.342487	1.434489
12	3.758352	3.672510	1.078569	.356175	.144966	-.000148	.003073	.961397	.342425	1.452906
13	3.758352	3.672510	1.078948	.355383	.067686	.000071	.001434	.963712	.342487	1.457703
14	3.758352	3.672510	1.079145	.355116	.026963	.000057	.000571	.964261	.342425	1.458971
15	3.758352	3.672510	1.079248	.355142	0.000000	0.000000	0.000000	.964366	.342486	1.459087

J= 22 K= 6

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	3.700523	0.000000	.423369	.949167	-.000803	0.000000	.812249	.343881	1.145517
2	3.758352	3.700523	.519504	.422866	.949654	-.000829	.013020	.811662	.343225	1.145234
3	3.758352	3.700523	.788966	.422322	.950628	-.000897	.021010	.810917	.342468	1.144771
4	3.758352	3.700523	.928734	.422353	.950278	-.000958	.023332	.811516	.342746	1.145583
5	3.758352	3.700523	1.001231	.420866	.943450	-.001056	.024040	.814397	.342752	1.151273
6	3.758352	3.700523	1.038834	.416417	.920001	-.001429	.023048	.822855	.342651	1.168185
7	3.758352	3.700523	1.058338	.407752	.866696	-.002213	.020519	.840516	.342723	1.203338
8	3.758352	3.700523	1.068455	.394393	.769972	-.002839	.017191	.868818	.342656	1.260542
9	3.758352	3.700523	1.073703	.378644	.619219	-.002309	.013263	.905128	.342721	1.334804
10	3.758352	3.700523	1.076425	.365168	.423549	-.000894	.008958	.938344	.342653	1.403994
11	3.758352	3.700523	1.077836	.358381	.240656	.000107	.005082	.956298	.342719	1.441635
12	3.758352	3.700523	1.078569	.356104	.121832	.000262	.002577	.962223	.342652	1.454269
13	3.758352	3.700523	1.078948	.355576	.057073	.000164	.001209	.963839	.342718	1.457576
14	3.758352	3.700523	1.079145	.355365	.022769	.000071	.000483	.964225	.342652	1.458507
15	3.758352	3.700523	1.079248	.355407	0.000000	0.000000	0.000000	.964299	.342718	1.458550

J= 22 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	3.708682	0.000000	.384826	.676973	-.000127	0.000000	.893022	.343658	1.308448
2	3.758352	3.708682	.519504	.384271	.676855	-.000135	.011203	.892517	.342968	1.308464
3	3.758352	3.708682	.788966	.383560	.676047	-.000151	.017659	.892041	.342151	1.308735
4	3.758352	3.708682	.928734	.383457	.672660	-.000149	.018933	.892996	.342426	1.310276
5	3.758352	3.708682	1.001231	.382337	.660763	-.000152	.019260	.895794	.342495	1.315921
6	3.758352	3.708682	1.038834	.379432	.630273	-.000209	.018181	.902452	.342419	1.329752
7	3.758352	3.708682	1.058338	.374780	.573975	-.000305	.015311	.913783	.342467	1.353108
8	3.758352	3.708682	1.068455	.369147	.494300	-.000322	.011653	.927571	.342410	1.381871
9	3.758352	3.708682	1.073703	.363723	.395537	-.000207	.008465	.941570	.342470	1.411056
10	3.758352	3.708682	1.076425	.359055	.277211	-.000138	.005777	.953643	.342410	1.436552
11	3.758352	3.708682	1.077836	.356474	.162512	-.000187	.003379	.960712	.342469	1.451384
12	3.758352	3.708682	1.078569	.355470	.083805	-.000208	.001753	.963259	.342409	1.456875
13	3.758352	3.708682	1.078948	.355260	.039603	-.000138	.000834	.963993	.342468	1.458328
14	3.758352	3.708682	1.079145	.355133	.015866	-.000061	.000335	.964172	.342409	1.458808
15	3.758352	3.708682	1.079248	.355181	0.000000	0.000000	0.000000	.964207	.342468	1.458781

J= 22 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	3.711059	0.000000	.360421	.304980	.000017	0.000000	.954098	.343878	1.435056
2	3.758352	3.711059	.519504	.359927	.304496	.000015	.006081	.953584	.343221	1.435070
3	3.758352	3.711059	.788966	.359361	.303101	.000011	.009050	.952981	.342464	1.435066
4	3.758352	3.711059	.928734	.359551	.300275	.000013	.008989	.953250	.342742	1.435168
5	3.758352	3.711059	1.001231	.359389	.292290	.000013	.009231	.953702	.342750	1.436107
6	3.758352	3.711059	1.038834	.358859	.273535	.000003	.008510	.954841	.342653	1.438672

7	3.758352	3.711059	1.058338	.358225	.243090	- .000013	.006709	956743	.342729	1.442557
8	3.758352	3.711059	1.068455	.357454	.207001	- .000019	.004934	958627	.342665	1.446643
9	3.758352	3.711059	1.073703	.356791	168438	- .000026	.003759	960592	.342730	1.450687
10	3.758352	3.711059	1.076425	.356030	122837	.000018	.002720	962444	.342659	1.454725
11	3.758352	3.711059	1.077836	.355624	.075607	.000072	.001677	963732	.342726	1.457336
12	3.758352	3.711059	1.078569	.355369	.040642	- .000134	.000871	964232	.342658	1.458512
13	3.758352	3.711059	1.078948	.355378	.019672	- .000165	.000423	964399	.342726	1.458750
14	3.758352	3.711059	1.079145	.355291	.007982	- .000067	.000153	964441	.342657	1.458955
15	3.758352	3.711059	1.079248	.355360	0.000000	0.000000	0.000000	964449	.342726	1.458855

J= 22 K= 9

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	3.711751	0.000000	.355841	.097742	- .000000	0.000000	.965763	.343658	1.460052
2	3.758352	3.711751	519504	.355333	.097531	- .000001	.002126	965203	.342968	1.460039
3	3.758352	3.711751	788966	.354753	.096971	- .000001	.003030	964475	.342151	1.459891
4	3.758352	3.711751	928734	.355025	.095988	.000000	.002783	964513	.342426	1.459501
5	3.758352	3.711751	1.001231	.355165	.093306	- .000000	.002928	964332	.342497	1.458996
6	3.758352	3.711751	1.038834	.355190	.087098	- .000001	.002733	964057	.342423	1.458541
7	3.758352	3.711751	1.058338	.355300	.077286	- .000000	.002137	963900	.342473	1.458122
8	3.758352	3.711751	1.068455	.355306	.066015	- .000000	.001576	963720	.342415	1.457841
9	3.758352	3.711751	1.073703	.355302	.054201	- .000000	.001229	963878	.342468	1.458085
10	3.758352	3.711751	1.076425	.355150	.040443	- .000000	.000790	964126	.342409	1.458709
11	3.758352	3.711751	1.077836	.355139	.025728	.000000	.000728	964338	.342474	1.459050
12	3.758352	3.711751	1.078569	.355052	.014277	- .000000	.000417	964377	.342403	1.459251
13	3.758352	3.711751	1.078948	.355114	.007197	.000000	.000174	964400	.342471	1.459185
14	3.758352	3.711751	1.079145	.355039	.003011	.000000	.000073	964410	.342404	1.459322
15	3.758352	3.711751	1.079248	.355110	0.000000	0.000000	0.000000	964409	.342471	1.459205

J= 22 K= 10

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.758352	3.711952	0.000000	.355565	0.000000	0.000000	0.000000	.967130	.343877	1.462572
2	3.758352	3.711952	519504	.355094	0.000000	0.000000	0.000000	966564	.343221	1.462492
3	3.758352	3.711952	788966	.354583	0.000000	0.000000	0.000000	965822	.342464	1.462211
4	3.758352	3.711952	928734	.354868	0.000000	0.000000	0.000000	965833	.342743	1.461758
5	3.758352	3.711952	1.001231	.354971	0.000000	0.000000	0.000000	965578	.342752	1.461202
6	3.758352	3.711952	1.038834	.355032	0.000000	0.000000	0.000000	965142	.342656	1.460442
7	3.758352	3.711952	1.058338	.355253	0.000000	0.000000	0.000000	964752	.342731	1.459888
8	3.758352	3.711952	1.068455	.355336	0.000000	0.000000	0.000000	964339	.342664	1.458728
9	3.758352	3.711952	1.073703	.355418	0.000000	0.000000	0.000000	964295	.342728	1.458526
10	3.758352	3.711952	1.076425	.355327	0.000000	0.000000	0.000000	964350	.342660	1.458759
11	3.758352	3.711952	1.077836	.355371	0.000000	0.000000	0.000000	964423	.342728	1.458795
12	3.758352	3.711952	1.078569	.355308	0.000000	0.000000	0.000000	964407	.342661	1.458876
13	3.758352	3.711952	1.078948	.355381	0.000000	0.000000	0.000000	964395	.342727	1.458738
14	3.758352	3.711952	1.079145	.355283	0.000000	0.000000	0.000000	964356	.342619	1.458840
15	3.758352	3.711952	1.079248	.355196	0.000000	0.000000	0.000000	964382	.342545	1.459022

J= 23 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	4.222346	0.000000	0.000000	.455326	1.149831	0.000000	0.000000	.731730	.333176	1.002356
2	4.222346	0.000000	524240	.455042	1.150842	0.000000	010951	.731059	.332663	1.001687
3	4.222346	0.000000	796159	.455206	1.154372	0.000000	017836	.729588	.332113	.999527
4	4.222346	0.000000	937201	.456676	1.161028	0.000000	020383	.727858	.332396	.995872
5	4.222346	0.000000	1.010358	.457748	1.168604	0.000000	022048	.726211	.332422	.992687
6	4.222346	0.000000	1.048305	.456059	1.167465	0.000000	022947	.728800	.332376	.997700
7	4.222346	0.000000	1.067987	.446505	1.136228	0.000000	022895	.744466	.332408	1.027814
8	4.222346	0.000000	1.078196	.423636	1.040830	0.000000	021321	.784553	.332365	1.106178
9	4.222346	0.000000	1.083491	.390463	.846839	0.000000	017609	.851304	.332402	1.240090
10	4.222346	0.000000	1.086238	.362169	.569418	0.000000	012006	.917697	.332361	1.377637
11	4.222346	0.000000	1.087663	.349296	.315403	0.000000	006677	.951630	.332400	1.449407
12	4.222346	0.000000	1.088402	.345464	.157643	0.000000	003340	.962070	.332360	1.471789
13	4.222346	0.000000	1.088785	.344519	.073490	0.000000	001558	.964823	.332400	1.477618
14	4.222346	0.000000	1.088984	.344246	.029254	0.000000	000620	.965474	.332360	1.479085
15	4.222346	0.000000	1.089087	.344243	0.000000	0.000000	0.000000	.965598	.332400	1.479280

J= 23 K= 2

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	4.222346	1.670379	0.000000	.455728	1.149793	- .001878	0.000000	.731930	.333561	1.002276
2	4.222346	1.670379	524240	.455449	1.150805	- .001991	010902	.731259	.333051	1.001602
3	4.222346	1.670379	796159	.455615	1.154317	- .002312	017768	.729788	.332502	.999442

	4	4 222346	1 670379	937201	457057	1 160875	- 002810	020337	728076	332772	995838
	5	4 222346	1 670379	1 010358	458064	1 168185	- 003489	022021	726515	332790	992828
	6	4 222346	1 670379	1 048305	456264	1 166551	- 004402	022921	729281	332745	998179
	7	4 222346	1 670379	1 067987	446579	1 134649	- 005542	022863	745165	332775	1 028710
	8	4 222346	1 670379	1 078196	423667	1 038686	- 006632	021279	785362	332732	1 107287
	9	4 222346	1 670379	1 083491	390602	844597	- 006943	017563	851939	332769	1 240836
	10	4 222346	1 670379	1 086238	362458	567840	- 005734	011973	917980	332729	1 377623
	11	4 222346	1 670379	1 087663	349645	314592	- 003593	006660	951727	332767	1 448977
	12	4 222346	1 670379	1 088402	345829	157256	- 001882	003332	962119	332728	1 471243
	13	4 222346	1 670379	1 088785	344886	073311	- 000890	001554	964860	332766	1 477046
	14	4 222346	1 670379	1 088984	344614	029183	- 000357	000619	965508	332728	1 478504
	15	4 222346	1 670379	1 089087	344610	0 000000	0 000000	0 000000	965631	332766	1 478700

J= 23 K= 3	L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
	1	4 222346	3 246102	0 000000	455738	1 146622	- 002923	0 000000	733738	334392	1 004743
	2	4 222346	3 246102	524240	455478	1 147619	- 003088	010891	733081	333902	1 004072
	3	4 222346	3 246102	796159	455668	1 151009	- 003597	017695	731674	333401	1 001979
	4	4 222346	3 246102	937201	457038	1 157117	- 004466	020224	730134	333699	998669
	5	4 222346	3 246102	1 010358	457798	1 163357	- 005744	021905	728959	333716	996399
	6	4 222346	3 246102	1 048305	455607	1 159923	- 007516	022785	732368	333672	1 002982
	7	4 222346	3 246102	1 067987	445587	1 125847	- 009654	022692	748900	333700	1 034787
	8	4 222346	3 246102	1 078196	422799	1 028308	- 011478	021079	789171	333660	1 113570
	9	4 222346	3 246102	1 083491	390435	834837	- 011650	017369	854672	333694	1 245030
	10	4 222346	3 246102	1 086238	363018	561374	- 009217	011839	919120	333657	1 378481
	11	4 222346	3 246102	1 087663	350486	311413	- 005577	006594	952083	333692	1 448126
	12	4 222346	3 246102	1 088402	346736	155780	- 002881	003301	962276	333656	1 469941
	13	4 222346	3 246102	1 088785	345806	072638	- 001361	001540	964968	333692	1 475639
	14	4 222346	3 246102	1 088984	345540	028918	- 000546	000613	965606	333656	1 477067
	15	4 222346	3 246102	1 089087	345534	0 000000	0 000000	0 000000	965727	333692	1 477263

J= 23 K= 4	L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
	1	4 222346	3 576131	0 000000	451560	1 129862	- 002409	0 000000	741107	334655	1 018579
	2	4 222346	3 576131	524240	451278	1 130768	- 002508	011329	740471	334158	1 017960
	3	4 222346	3 576131	796159	451389	1 133737	- 002878	018257	739227	333679	1 016150
	4	4 222346	3 576131	937201	452522	1 138644	- 003648	020589	738183	334044	1 013697
	5	4 222346	3 576131	1 010358	452730	1 142332	- 004988	021975	737989	334110	1 013244
	6	4 222346	3 576131	1 048305	449784	1 134934	- 007069	022591	742776	334089	1 022483
	7	4 222346	3 576131	1 067987	439440	1 096611	- 009594	022292	760329	334119	1 056432
	8	4 222346	3 576131	1 078196	411701	997102	- 011405	020558	799817	334084	1 134082
	9	4 222346	3 576131	1 083491	367758	807393	- 011132	016858	861658	334115	1 258666
	10	4 222346	3 576131	1 086238	342500	543741	- 008025	011488	921602	334081	1 382994
	11	4 222346	3 576131	1 087663	330802	302688	- 004301	006416	952426	334113	1 448125
	12	4 222346	3 576131	1 088402	327257	151683	- 002011	003217	962055	334080	1 468723
	13	4 222346	3 576131	1 088785	326371	070769	- 000898	001501	964608	334113	1 474125
	14	4 222346	3 576131	1 088984	326120	028181	- 000350	000598	965213	334080	1 475477
	15	4 222346	3 576131	1 089087	326113	0 000000	0 000000	0 000000	965328	334113	1 475665

J= 23 K= 5	L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
	1	4 222346	3 672395	0 000000	438740	1 079365	- 001150	0 000000	761976	334309	1 059396
	2	4 222346	3 672395	524240	438384	1 080031	- 001180	012220	761384	333778	1 058917
	3	4 222346	3 672395	796159	438206	1 082047	- 001273	019674	760401	333212	1 057722
	4	4 222346	3 672395	937201	438717	1 084598	- 001470	022023	760152	333491	1 056882
	5	4 222346	3 672395	1 010358	437928	1 083572	- 002038	022962	761569	333512	1 059514
	6	4 222346	3 672395	1 048305	433946	1 069049	- 003420	022792	768521	333497	1 073202
	7	4 222346	3 672395	1 067987	423716	1 023614	- 005354	021704	787146	333526	1 109750
	8	4 222346	3 672395	1 078196	404879	922526	- 006633	019461	823694	333497	1 182594
	9	4 222346	3 672395	1 083491	380335	743500	- 005882	015680	876918	333522	1 290899
	10	4 222346	3 672395	1 086238	359711	502108	- 003234	010640	927114	333493	1 395570
	11	4 222346	3 672395	1 087663	349904	281141	- 000863	005963	953177	333520	1 450754
	12	4 222346	3 672395	1 088402	346859	141300	000021	002995	961464	333492	1 468494
	13	4 222346	3 672395	1 088785	346091	065994	000139	001399	963677	333520	1 473178
	14	4 222346	3 672395	1 088984	345874	026292	000082	000557	964202	333492	1 474352
	15	4 222346	3 672395	1 089087	345867	0 000000	0 000000	0 000000	964302	333520	1 474517

J= 23 K= 6	L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT

1	4.222346	3.700473	0.000000	.411812	.947010	-.000763	0.000000	.812385	.334550	1.158464
2	4.222346	3.700473	.524240	.411428	.947233	-.000789	.012455	.811930	.334051	1.158246
3	4.222346	3.700473	.796159	.411059	.947696	-.000849	.019982	.811445	.333552	1.157970
4	4.222346	3.700473	.937201	.411029	.946780	-.000893	.022345	.812239	.333854	1.159138
5	4.222346	3.700473	1.010358	.409399	.938963	-.000975	.023200	.815396	.333822	1.165493
6	4.222346	3.700473	1.048305	.404920	.914062	-.001291	.022280	.824269	.333763	1.183372
7	4.222346	3.700473	1.067987	.396311	.859178	-.001918	.019940	.842260	.333797	1.219639
8	4.222346	3.700473	1.078196	.383255	.760618	-.002364	.016775	.870865	.333763	1.278073
9	4.222346	3.700473	1.083491	.367949	.607908	-.001855	.012964	.907176	.333795	1.353246
10	4.222346	3.700473	1.086238	.355180	.412897	-.000700	.008726	.939694	.333761	1.421696
11	4.222346	3.700473	1.087663	.348840	.233959	.000080	.004941	.956865	.333793	1.458144
12	4.222346	3.700473	1.088402	.346758	.118501	.000191	.002507	.962515	.333760	1.470269
13	4.222346	3.700473	1.088785	.346237	.055543	.000117	.001177	.964056	.333792	1.473508
14	4.222346	3.700473	1.088984	.346071	.022163	.000050	.000471	.964424	.333759	1.474355
15	4.222346	3.700473	1.089087	.346080	0.000000	0.000000	0.000000	.964495	.333792	1.474449

J= 23 K= 7

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	4.222346	3.708664	0.000000	.374000	.670343	-.000112	0.000000	.893921	.334327	1.324801
2	4.222346	3.708664	.524240	.373558	.669844	-.000120	.010365	.893562	.333797	1.324894
3	4.222346	3.708664	.796159	.373016	.668330	-.000131	.016224	.893354	.333236	1.325356
4	4.222346	3.708664	.937201	.372882	.664350	-.000123	.017591	.894434	.333519	1.327148
5	4.222346	3.708664	1.010358	.371722	.651925	-.000123	.018112	.897267	.333534	1.333013
6	4.222346	3.708664	1.048305	.369002	.621707	-.000171	.017117	.903782	.333497	1.346642
7	4.222346	3.708664	1.067987	.364655	.567358	-.000246	.014547	.914595	.333512	1.369228
8	4.222346	3.708664	1.078196	.359332	.489695	-.000250	.011267	.928076	.333488	1.397606
9	4.222346	3.708664	1.083491	.353961	.390276	-.000167	.008319	.942232	.333514	1.427497
10	4.222346	3.708664	1.086238	.349432	.271194	-.000141	.005672	.954370	.333487	1.453355
11	4.222346	3.708664	1.087663	.346963	.158506	-.000179	.003307	.961233	.333512	1.467964
12	4.222346	3.708664	1.088402	.346049	.081814	-.000191	.001714	.963697	.333486	1.473280
13	4.222346	3.708664	1.088785	.345821	.038687	-.000124	.000816	.964404	.333512	1.474750
14	4.222346	3.708664	1.088984	.345733	.015502	-.000055	.000328	.964578	.333486	1.475167
15	4.222346	3.708664	1.089087	.345747	0.000000	0.000000	0.000000	.964611	.333511	1.475193

J= 23 K= 8

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	4.222346	3.711052	0.000000	.350715	.300092	.000019	0.000000	.953896	.334546	1.450505
2	4.222346	3.711052	.524240	.350348	.299373	.000016	.005345	.953473	.334047	1.450469
3	4.222346	3.711052	.796159	.349989	.297631	.000013	.007888	.953025	.333549	1.450381
4	4.222346	3.711052	.937201	.350202	.294645	.000015	.008056	.953309	.333851	1.450461
5	4.222346	3.711052	1.010358	.350018	.286681	.000014	.008516	.953724	.333821	1.451397
6	4.222346	3.711052	1.048305	.349556	.268895	.000005	.007901	.954825	.333765	1.453841
7	4.222346	3.711052	1.067987	.348934	.240784	-.000008	.006362	.956635	.333803	1.457635
8	4.222346	3.711052	1.078196	.348156	.206568	-.000012	.004828	.958686	.333772	1.462066
9	4.222346	3.711052	1.083491	.347367	.167366	-.000022	.003750	.960949	.333802	1.466848
10	4.222346	3.711052	1.086238	.346584	.120680	.000018	.002678	.963014	.333765	1.471327

PRINTOUT OF FLOWFIELD INITIAL DATA FOR TEST CASE NO. 4

NOZZLE FLOW FIELD AS WRITTEN TO RESTART FILE AT STEP 0 TIME = .00000 DT= .05000

J= 1 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-9.055118	.000000	.000000	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
2	-9.055118	.000000	.691889	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
3	-9.055118	.000000	1.100368	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
4	-9.055118	.000000	1.341528	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
5	-9.055118	.000000	1.483905	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
6	-9.055118	.000000	1.567962	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
7	-9.055118	.000000	1.617587	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
8	-9.055118	.000000	1.646886	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
9	-9.055118	.000000	1.664183	.975332	.181716	.000000	.000000	.993396	.968890	1.003371
10	-9.055118	.000000	1.674395	.973354	.151430	.000000	.000000	.995414	.968890	1.006225
11	-9.055118	.000000	1.680424	.971743	.121144	.000000	.000000	.997065	.968890	1.008563
12	-9.055118	.000000	1.683983	.970493	.090858	.000000	.000000	.998349	.968890	1.010382
13	-9.055118	.000000	1.686085	.969602	.060572	.000000	.000000	.999266	.968890	1.011681
14	-9.055118	.000000	1.687325	.969068	.030286	.000000	.000000	.999817	.968890	1.012462
15	-9.055118	.000000	1.688058	.968890	.000000	.000000	.000000	1.000000	.968890	1.012722
16	-9.055118	.000000	2.000000	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-9.055118	.000000	2.000031	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-9.055118	.000000	2.000110	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-9.055118	.000000	2.000309	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-9.055118	.000000	2.000807	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-9.055118	.000000	2.002059	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-9.055118	.000000	2.005204	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-9.055118	.000000	2.013103	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	-9.055118	.000000	2.032944	.482574	.588771	.000000	.000000	1.036110	.500000	1.386892
25	-9.055118	.000000	2.082783	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-9.055118	.000000	2.207974	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-9.055118	.000000	2.522438	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-9.055118	.000000	3.312338	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 2 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7.742782	.000000	.000000	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
2	-7.742782	.000000	.691889	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
3	-7.742782	.000000	1.100368	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
4	-7.742782	.000000	1.341528	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
5	-7.742782	.000000	1.483905	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
6	-7.742782	.000000	1.567962	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
7	-7.742782	.000000	1.617587	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
8	-7.742782	.000000	1.646886	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
9	-7.742782	.000000	1.664183	.975332	.181716	.000000	.000000	.993396	.968890	1.003371
10	-7.742782	.000000	1.674395	.973354	.151430	.000000	.000000	.995414	.968890	1.006225
11	-7.742782	.000000	1.680424	.971743	.121144	.000000	.000000	.997065	.968890	1.008563
12	-7.742782	.000000	1.683983	.970493	.090858	.000000	.000000	.998349	.968890	1.010382
13	-7.742782	.000000	1.686085	.969602	.060572	.000000	.000000	.999266	.968890	1.011681
14	-7.742782	.000000	1.687325	.969068	.030286	.000000	.000000	.999817	.968890	1.012462
15	-7.742782	.000000	1.688058	.968890	.000000	.000000	.000000	1.000000	.968890	1.012722
16	-7.742782	.000000	2.000000	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-7.742782	.000000	2.000031	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-7.742782	.000000	2.000110	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-7.742782	.000000	2.000309	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-7.742782	.000000	2.000807	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-7.742782	.000000	2.002059	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-7.742782	.000000	2.005204	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-7.742782	.000000	2.013103	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869

24	-7.742782	.000000	2.032944	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-7.742782	.000000	2.082783	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-7.742782	.000000	2.207974	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-7.742782	.000000	2.522438	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-7.742782	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 3 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6.430446	.000000	.000000	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
2	-6.430446	.000000	.691889	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
3	-6.430446	.000000	1.100368	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
4	-6.430446	.000000	1.341528	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
5	-6.430446	.000000	1.483905	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
6	-6.430446	.000000	1.567962	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
7	-6.430446	.000000	1.617587	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
8	-6.430446	.000000	1.646886	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
9	-6.430446	.000000	1.664183	.975332	.181716	.000000	.000000	.993396	.968890	1.003371
10	-6.430446	.000000	1.674395	.973354	.151430	.000000	.000000	.995414	.968890	1.006225
11	-6.430446	.000000	1.680424	.971743	.121144	.000000	.000000	.997065	.968890	1.008563
12	-6.430446	.000000	1.683983	.970493	.090858	.000000	.000000	.998349	.968890	1.010382
13	-6.430446	.000000	1.686085	.969602	.060572	.000000	.000000	.999266	.968890	1.011681
14	-6.430446	.000000	1.687325	.969068	.030286	.000000	.000000	.999817	.968890	1.012462
15	-6.430446	.000000	1.688058	.968890	.000000	.000000	.000000	1.000000	.968890	1.012722
16	-6.430446	.000000	2.000000	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-6.430446	.000000	2.000031	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-6.430446	.000000	2.000110	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-6.430446	.000000	2.000309	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-6.430446	.000000	2.000807	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-6.430446	.000000	2.002059	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-6.430446	.000000	2.005204	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-6.430446	.000000	2.013103	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	-6.430446	.000000	2.032944	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-6.430446	.000000	2.082783	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-6.430446	.000000	2.207974	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-6.430446	.000000	2.522438	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-6.430446	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 4 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5.118110	.000000	.000000	.977679	.212002	.000000	.000000	.991011	.968890	1.000000
2	-5.118110	.000000	.691889	.977679	.212002	.000000	-.000922	.991011	.968890	1.000000
3	-5.118110	.000000	1.100368	.977679	.212002	.000000	-.001466	.991011	.968890	1.000000
4	-5.118110	.000000	1.341528	.977679	.212002	.000000	-.001788	.991011	.968890	1.000000
5	-5.118110	.000000	1.483905	.977679	.212002	.000000	-.001978	.991011	.968890	1.000000
6	-5.118110	.000000	1.567962	.977679	.212002	.000000	-.002090	.991011	.968890	1.000000
7	-5.118110	.000000	1.617587	.977679	.212002	.000000	-.002156	.991011	.968890	1.000000
8	-5.118110	.000000	1.646886	.977679	.212002	.000000	-.002195	.991011	.968890	1.000000
9	-5.118110	.000000	1.664183	.975332	.181716	.000000	-.001901	.993396	.968890	1.003371
10	-5.118110	.000000	1.674395	.973354	.151430	.000000	-.001594	.995414	.968890	1.006225
11	-5.118110	.000000	1.680424	.971743	.121144	.000000	-.001280	.997065	.968890	1.008563
12	-5.118110	.000000	1.683983	.970493	.090858	.000000	-.000962	.998349	.968890	1.010382
13	-5.118110	.000000	1.686085	.969602	.060572	.000000	-.000642	.999266	.968890	1.011681
14	-5.118110	.000000	1.687325	.969068	.030286	.000000	-.000321	.999817	.968890	1.012462
15	-5.118110	.000000	1.688058	.968890	.000000	.000000	.000000	1.000000	.968890	1.012722
16	-5.118110	.000000	2.000000	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-5.118110	.000000	2.000031	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-5.118110	.000000	2.000110	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-5.118110	.000000	2.000309	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-5.118110	.000000	2.000807	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-5.118110	.000000	2.002059	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283

22	-5.118110	.000000	2.005204	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-5.118110	.000000	2.013103	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	-5.118110	.000000	2.032944	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-5.118110	.000000	2.082783	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-5.118110	.000000	2.207974	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-5.118110	.000000	2.522438	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-5.118110	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 5 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4.068241	.000000	.000000	.976244	.218758	.000000	.000000	.990429	.966900	1.000000
2	-4.068241	.000000	.681615	.976244	.218758	.000000	-.003042	.990429	.966900	1.000000
3	-4.068241	.000000	1.084029	.976244	.218758	.000000	-.004838	.990429	.966900	1.000000
4	-4.068241	.000000	1.321608	.976244	.218758	.000000	-.005899	.990429	.966900	1.000000
5	-4.068241	.000000	1.461870	.976244	.218758	.000000	-.006525	.990429	.966900	1.000000
6	-4.068241	.000000	1.544679	.976244	.218758	.000000	-.006894	.990429	.966900	1.000000
7	-4.068241	.000000	1.593568	.976244	.218758	.000000	-.007112	.990429	.966900	1.000000
8	-4.068241	.000000	1.622431	.976244	.218758	.000000	-.007241	.990429	.966900	1.000000
9	-4.068241	.000000	1.639472	.973748	.187507	.000000	-.006272	.992968	.966900	1.003591
10	-4.068241	.000000	1.649532	.971645	.156256	.000000	-.005259	.995117	.966900	1.006633
11	-4.068241	.000000	1.655472	.969932	.125004	.000000	-.004222	.996875	.966900	1.009123
12	-4.068241	.000000	1.658978	.968603	.093753	.000000	-.003173	.998242	.966900	1.011061
13	-4.068241	.000000	1.661048	.967656	.062502	.000000	-.002118	.999219	.966900	1.012446
14	-4.068241	.000000	1.662271	.967089	.031251	.000000	-.001060	.999805	.966900	1.013278
15	-4.068241	.000000	1.662992	.966900	.000000	.000000	.000000	1.000000	.966900	1.013555
16	-4.068241	.000000	1.980640	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-4.068241	.000000	1.980672	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-4.068241	.000000	1.980753	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-4.068241	.000000	1.980954	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-4.068241	.000000	1.981460	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-4.068241	.000000	1.982730	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-4.068241	.000000	1.985921	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-4.068241	.000000	1.993937	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	-4.068241	.000000	2.014071	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-4.068241	.000000	2.064645	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-4.068241	.000000	2.191682	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-4.068241	.000000	2.510785	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-4.068241	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 6 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3.280840	.000000	.000000	.973886	.229440	.000000	.000000	.989471	.963632	1.000000
2	-3.280840	.000000	.666339	.973886	.229440	.000000	-.005921	.989471	.963632	1.000000
3	-3.280840	.000000	1.059734	.973886	.229440	.000000	-.009417	.989471	.963632	1.000000
4	-3.280840	.000000	1.291988	.973886	.229440	.000000	-.011481	.989471	.963632	1.000000
5	-3.280840	.000000	1.429108	.973886	.229440	.000000	-.012699	.989471	.963632	1.000000
6	-3.280840	.000000	1.510060	.973886	.229440	.000000	-.013418	.989471	.963632	1.000000
7	-3.280840	.000000	1.557854	.973886	.229440	.000000	-.013843	.989471	.963632	1.000000
8	-3.280840	.000000	1.586070	.973886	.229440	.000000	-.014094	.989471	.963632	1.000000
9	-3.280840	.000000	1.602728	.971145	.196663	.000000	-.012207	.992265	.963632	1.003554
10	-3.280840	.000000	1.612563	.968837	.163886	.000000	-.010235	.994628	.963632	1.007304
11	-3.280840	.000000	1.618370	.966957	.131109	.000000	-.008218	.996562	.963632	1.010047
12	-3.280840	.000000	1.621798	.965500	.098331	.000000	-.006176	.998066	.963632	1.012182
13	-3.280840	.000000	1.623822	.964461	.065554	.000000	-.004123	.999141	.963632	1.013707
14	-3.280840	.000000	1.625016	.963840	.032777	.000000	-.002063	.999785	.963632	1.014623
15	-3.280840	.000000	1.625722	.963632	.000000	.000000	.000000	1.000000	.963632	1.014928
16	-3.280840	.000000	1.938270	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-3.280840	.000000	1.938303	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-3.280840	.000000	1.938386	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-3.280840	.000000	1.938594	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317

20	-3.280840	.000000	1.939116	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-3.280840	.000000	1.940426	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-3.280840	.000000	1.943719	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-3.280840	.000000	1.951989	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	-3.280840	.000000	1.972764	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-3.280840	.000000	2.024948	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-3.280840	.000000	2.156027	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-3.280840	.000000	2.485283	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-3.280840	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 7 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2.650919	.000000	.000000	.970077	.245749	.000000	.000000	.987921	.958360	1.000000
2	-2.650919	.000000	.645038	.970077	.245749	.000000	-.009188	.987921	.958360	1.000000
3	-2.650919	.000000	1.025858	.970077	.245749	.000000	-.014613	.987921	.958360	1.000000
4	-2.650919	.000000	1.250688	.970077	.245749	.000000	-.017815	.987921	.958360	1.000000
5	-2.650919	.000000	1.383424	.970077	.245749	.000000	-.019706	.987921	.958360	1.000000
6	-2.650919	.000000	1.461789	.970077	.245749	.000000	-.020822	.987921	.958360	1.000000
7	-2.650919	.000000	1.508055	.970077	.245749	.000000	-.021481	.987921	.958360	1.000000
8	-2.650919	.000000	1.535369	.970077	.245749	.000000	-.021870	.987921	.958360	1.000000
9	-2.650919	.000000	1.551495	.966940	.210642	.000000	-.018943	.991126	.958360	1.004544
10	-2.650919	.000000	1.561016	.964302	.175535	.000000	-.015883	.993837	.958360	1.008394
11	-2.650919	.000000	1.566636	.962154	.140428	.000000	-.012752	.996056	.958360	1.011546
12	-2.650919	.000000	1.569955	.960491	.105321	.000000	-.009584	.997781	.958360	1.014001
13	-2.650919	.000000	1.571914	.959306	.070214	.000000	-.006397	.999014	.958360	1.015755
14	-2.650919	.000000	1.573070	.958596	.035107	.000000	-.003201	.999753	.958360	1.016807
15	-2.650919	.000000	1.573753	.958360	.000000	.000000	.000000	1.000000	.958360	1.017158
16	-2.650919	.000000	1.887087	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-2.650919	.000000	1.887121	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-2.650919	.000000	1.887207	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-2.650919	.000000	1.887422	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-2.650919	.000000	1.887963	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-2.650919	.000000	1.889323	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-2.650919	.000000	1.892738	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-2.650919	.000000	1.901317	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	-2.650919	.000000	1.922865	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-2.650919	.000000	1.976993	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-2.650919	.000000	2.112954	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-2.650919	.000000	2.454475	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-2.650919	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 8 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2.204724	.000000	.000000	.966063	.261874	.000000	.000000	.986284	.952813	1.000000
2	-2.204724	.000000	.626105	.966063	.261874	.000000	-.011876	.986284	.952813	1.000000
3	-2.204724	.000000	.995746	.966063	.261874	.000000	-.018888	.986284	.952813	1.000000
4	-2.204724	.000000	1.213977	.966063	.261874	.000000	-.023027	.986284	.952813	1.000000
5	-2.204724	.000000	1.342817	.966063	.261874	.000000	-.025471	.986284	.952813	1.000000
6	-2.204724	.000000	1.418881	.966063	.261874	.000000	-.026914	.986284	.952813	1.000000
7	-2.204724	.000000	1.463789	.966063	.261874	.000000	-.027765	.986284	.952813	1.000000
8	-2.204724	.000000	1.490302	.966063	.261874	.000000	-.028268	.986284	.952813	1.000000
9	-2.204724	.000000	1.505954	.962512	.224463	.000000	-.024485	.989923	.952813	1.005169
10	-2.204724	.000000	1.515195	.959527	.187053	.000000	-.020529	.993002	.952813	1.009549
11	-2.204724	.000000	1.520651	.957099	.149642	.000000	-.016482	.995521	.952813	1.013136
12	-2.204724	.000000	1.523872	.955219	.112232	.000000	-.012388	.997481	.952813	1.015929
13	-2.204724	.000000	1.525774	.953881	.074821	.000000	-.008269	.998880	.952813	1.017925
14	-2.204724	.000000	1.526896	.953080	.037411	.000000	-.004138	.999720	.952813	1.019123
15	-2.204724	.000000	1.527559	.952813	.000000	.000000	.000000	1.000000	.952813	1.019523
16	-2.204724	.000000	1.841483	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-2.204724	.000000	1.841518	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060

18	-2.204724	.000000	1.841607	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-2.204724	.000000	1.841829	.459905	.302158	.000000	.000000	1.087180	.500000	1.483817
20	-2.204724	.000000	1.842388	.462358	.346609	.000000	.000000	1.081412	.500000	1.472812
21	-2.204724	.000000	1.843791	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-2.204724	.000000	1.847315	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-2.204724	.000000	1.856168	.475210	.516112	.000000	.000000	1.052166	.500000	1.416669
24	-2.204724	.000000	1.878406	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-2.204724	.000000	1.934266	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-2.204724	.000000	2.074578	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-2.204724	.000000	2.427026	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-2.204724	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 9 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.837270	.000000	.000000	.961581	.278822	.000000	.000000	.984452	.946630	1.000000
2	-1.837270	.000000	.608139	.961581	.278822	.000000	-.017156	.984452	.946630	1.000000
3	-1.837270	.000000	.967174	.961581	.278822	.000000	-.027284	.984452	.946630	1.000000
4	-1.837270	.000000	1.179143	.961581	.278822	.000000	-.033264	.984452	.946630	1.000000
5	-1.837270	.000000	1.304286	.961581	.278822	.000000	-.036794	.984452	.946630	1.000000
6	-1.837270	.000000	1.378168	.961581	.278822	.000000	-.038878	.984452	.946630	1.000000
7	-1.837270	.000000	1.421787	.961581	.278822	.000000	-.040109	.984452	.946630	1.000000
8	-1.837270	.000000	1.447539	.961581	.278822	.000000	-.040835	.984452	.946630	1.000000
9	-1.837270	.000000	1.462742	.957569	.238990	.000000	-.035369	.988577	.946630	1.005871
10	-1.837270	.000000	1.471718	.954200	.199158	.000000	-.029655	.992067	.946630	1.010847
11	-1.837270	.000000	1.477017	.951461	.159327	.000000	-.023810	.994923	.946630	1.014923
12	-1.837270	.000000	1.480146	.949342	.119495	.000000	-.017895	.997144	.946630	1.018097
13	-1.837270	.000000	1.481993	.947834	.079663	.000000	-.011945	.998731	.946630	1.020365
14	-1.837270	.000000	1.483083	.946931	.039832	.000000	-.005977	.999683	.946630	1.021727
15	-1.837270	.000000	1.483727	.946630	.000000	.000000	.000000	1.000000	.946630	1.022181
16	-1.837270	.000000	1.798071	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-1.837270	.000000	1.798107	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-1.837270	.000000	1.798198	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-1.837270	.000000	1.798427	.459905	.302158	.000000	.000000	1.087180	.500000	1.483817
20	-1.837270	.000000	1.799002	.462358	.346609	.000000	.000000	1.081412	.500000	1.472812
21	-1.837270	.000000	1.800447	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-1.837270	.000000	1.804075	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-1.837270	.000000	1.813190	.475210	.516112	.000000	.000000	1.052166	.500000	1.416669
24	-1.837270	.000000	1.836084	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-1.837270	.000000	1.893592	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-1.837270	.000000	2.038046	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-1.837270	.000000	2.400896	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-1.837270	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 10 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.533333	.000000	.000000	.954544	.303618	.000000	.000000	.981563	.936945	1.000000
2	-1.533333	.000000	.584795	.954544	.303618	.000000	-.038543	.981563	.936945	1.000000
3	-1.533333	.000000	.930048	.954544	.303618	.000000	-.061298	.981563	.936945	1.000000
4	-1.533333	.000000	1.133879	.954544	.303618	.000000	-.074733	.981563	.936945	1.000000
5	-1.533333	.000000	1.254218	.954544	.303618	.000000	-.082664	.981563	.936945	1.000000
6	-1.533333	.000000	1.325265	.954544	.303618	.000000	-.087347	.981563	.936945	1.000000
7	-1.533333	.000000	1.367209	.954544	.303618	.000000	-.090111	.981563	.936945	1.000000
8	-1.533333	.000000	1.391972	.954544	.303618	.000000	-.091743	.981563	.936945	1.000000
9	-1.533333	.000000	1.406592	.949810	.260244	.000000	-.079463	.986455	.936945	1.006983
10	-1.533333	.000000	1.415224	.945842	.216870	.000000	-.066626	.990593	.936945	1.012903
11	-1.533333	.000000	1.420319	.942620	.173496	.000000	-.053492	.993980	.936945	1.017754
12	-1.533333	.000000	1.423328	.940129	.130122	.000000	-.040204	.996614	.936945	1.021532
13	-1.533333	.000000	1.425104	.938357	.086748	.000000	-.026836	.998495	.936945	1.024233
14	-1.533333	.000000	1.426153	.937298	.043374	.000000	-.013428	.999624	.936945	1.025854
15	-1.533333	.000000	1.426772	.936945	.000000	.000000	.000000	1.000000	.936945	1.026395

16	-1.533333	.000000	1.758147	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-1.533333	.000000	1.758184	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-1.533333	.000000	1.758278	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-1.533333	.000000	1.758513	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-1.533333	.000000	1.759103	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-1.533333	.000000	1.760586	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-1.533333	.000000	1.764310	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-1.533333	.000000	1.773665	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	-1.533333	.000000	1.797162	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-1.533333	.000000	1.856187	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-1.533333	.000000	2.004449	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-1.533333	.000000	2.376866	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-1.533333	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 11 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.300000	.000000	.000000	.935875	.361671	.000000	.000000	.973839	.911391	1.000000
2	-1.300000	.000000	.539934	.935875	.361671	.000000	-.070951	.973839	.911391	1.000000
3	-1.300000	.000000	.858703	.935875	.361671	.000000	-.112840	.973839	.911391	1.000000
4	-1.300000	.000000	1.046899	.935875	.361671	.000000	-.137570	.973839	.911391	1.000000
5	-1.300000	.000000	1.158006	.935875	.361671	.000000	-.152170	.973839	.911391	1.000000
6	-1.300000	.000000	1.223602	.935875	.361671	.000000	-.160790	.973839	.911391	1.000000
7	-1.300000	.000000	1.262329	.935875	.361671	.000000	-.165879	.973839	.911391	1.000000
8	-1.300000	.000000	1.285193	.935875	.361671	.000000	-.168883	.973839	.911391	1.000000
9	-1.300000	.000000	1.298691	.929252	.310003	.000000	-.146278	.980780	.911391	1.009992
10	-1.300000	.000000	1.306661	.923721	.258336	.000000	-.122646	.986652	.911391	1.018469
11	-1.300000	.000000	1.311365	.919244	.206669	.000000	-.098470	.991458	.911391	1.025420
12	-1.300000	.000000	1.314143	.915792	.155002	.000000	-.074009	.995195	.911391	1.030836
13	-1.300000	.000000	1.315783	.913342	.103334	.000000	-.049401	.997864	.911391	1.034709
14	-1.300000	.000000	1.316751	.911878	.051667	.000000	-.024719	.999466	.911391	1.037035
15	-1.300000	.000000	1.317323	.911391	.000000	.000000	.000000	1.000000	.911391	1.037810
16	-1.300000	.000000	1.725018	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-1.300000	.000000	1.725056	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-1.300000	.000000	1.725152	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-1.300000	.000000	1.725392	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-1.300000	.000000	1.725995	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-1.300000	.000000	1.727509	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-1.300000	.000000	1.731313	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-1.300000	.000000	1.740867	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	-1.300000	.000000	1.764865	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-1.300000	.000000	1.825148	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-1.300000	.000000	1.976570	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-1.300000	.000000	2.356926	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-1.300000	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 12 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.066667	.000000	.000000	.903706	.445484	.000000	.000000	.960309	.867837	1.000000
2	-1.066667	.000000	.493246	.903706	.445484	.000000	-.075720	.960309	.867837	1.000000
3	-1.066667	.000000	.784450	.903706	.445484	.000000	-.120424	.960309	.867837	1.000000
4	-1.066667	.000000	.956372	.903706	.445484	.000000	-.146817	.960309	.867837	1.000000
5	-1.066667	.000000	1.057872	.903706	.445484	.000000	-.162399	.960309	.867837	1.000000
6	-1.066667	.000000	1.117796	.903706	.445484	.000000	-.171598	.960309	.867837	1.000000
7	-1.066667	.000000	1.153174	.903706	.445484	.000000	-.177029	.960309	.867837	1.000000
8	-1.066667	.000000	1.174061	.903706	.445484	.000000	-.180235	.960309	.867837	1.000000
9	-1.066667	.000000	1.186392	.893904	.381843	.000000	-.156110	.970839	.867837	1.015385
10	-1.066667	.000000	1.193672	.885775	.318203	.000000	-.130890	.979749	.867837	1.028456
11	-1.066667	.000000	1.197970	.879232	.254562	.000000	-.105089	.987040	.867837	1.039186
12	-1.066667	.000000	1.200507	.874210	.190922	.000000	-.078984	.992710	.867837	1.047553
13	-1.066667	.000000	1.202005	.870658	.127281	.000000	-.052722	.996760	.867837	1.053541

14	-1.066667	.000000	1.202890	.868541	.063641	.000000	-.026380	.999190	.867837	1.057139
15	-1.066667	.000000	1.203412	.867837	.000000	.000000	.000000	1.000000	.867837	1.058339
16	-1.066667	.000000	1.689730	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-1.066667	.000000	1.689769	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-1.066667	.000000	1.689866	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-1.066667	.000000	1.690112	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-1.066667	.000000	1.690728	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-1.066667	.000000	1.692276	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-1.066667	.000000	1.696164	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-1.066667	.000000	1.705930	.475210	.516112	.000000	.000000	1.052166	.500000	1.416669
24	-1.066667	.000000	1.730463	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-1.066667	.000000	1.792085	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-1.066667	.000000	1.946874	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-1.066667	.000000	2.335685	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-1.066667	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 13 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.800000	.000000	.000000	.855761	.549564	.000000	.000000	.939596	.804070	1.000000
2	-.800000	.000000	.454948	.855761	.549564	.000000	-.065624	.939596	.804070	1.000000
3	-.800000	.000000	.723541	.855761	.549564	.000000	-.104368	.939596	.804070	1.000000
4	-.800000	.000000	.882115	.855761	.549564	.000000	-.127242	.939596	.804070	1.000000
5	-.800000	.000000	.975734	.855761	.549564	.000000	-.140746	.939596	.804070	1.000000
6	-.800000	.000000	1.031005	.855761	.549564	.000000	-.148718	.939596	.804070	1.000000
7	-.800000	.000000	1.063636	.855761	.549564	.000000	-.153425	.939596	.804070	1.000000
8	-.800000	.000000	1.082901	.855761	.549564	.000000	-.156204	.939596	.804070	1.000000
9	-.800000	.000000	1.094275	.841410	.471055	.000000	-.135296	.955621	.804070	1.023959
10	-.800000	.000000	1.100990	.829638	.392546	.000000	-.113438	.969182	.804070	1.044359
11	-.800000	.000000	1.104954	.820248	.314037	.000000	-.091077	.980276	.804070	1.061134
12	-.800000	.000000	1.107295	.813091	.235528	.000000	-.068453	.988905	.804070	1.074235
13	-.800000	.000000	1.108676	.808054	.157018	.000000	-.045692	.995069	.804070	1.083620
14	-.800000	.000000	1.109492	.805062	.078509	.000000	-.022863	.998767	.804070	1.089262
15	-.800000	.000000	1.109974	.804070	.000000	.000000	.000000	1.000000	.804070	1.091145
16	-.800000	.000000	1.646740	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-.800000	.000000	1.646780	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-.800000	.000000	1.646880	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-.800000	.000000	1.647132	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-.800000	.000000	1.647765	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-.800000	.000000	1.649354	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-.800000	.000000	1.653345	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-.800000	.000000	1.663370	.475210	.516112	.000000	.000000	1.052166	.500000	1.416669
24	-.800000	.000000	1.688552	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-.800000	.000000	1.751807	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-.800000	.000000	1.910697	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-.800000	.000000	2.309810	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-.800000	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 14 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.533333	.000000	.000000	.795286	.661625	.000000	.000000	.912450	.725659	1.000000
2	-.533333	.000000	.429559	.795286	.661625	.000000	-.049779	.912450	.725659	1.000000
3	-.533333	.000000	.683164	.795286	.661625	.000000	-.079168	.912450	.725659	1.000000
4	-.533333	.000000	.832888	.795286	.661625	.000000	-.096518	.912450	.725659	1.000000
5	-.533333	.000000	.921283	.795286	.661625	.000000	-.106762	.912450	.725659	1.000000
6	-.533333	.000000	.973470	.795286	.661625	.000000	-.112809	.912450	.725659	1.000000
7	-.533333	.000000	1.004280	.795286	.661625	.000000	-.116380	.912450	.725659	1.000000
8	-.533333	.000000	1.022470	.795286	.661625	.000000	-.118488	.912450	.725659	1.000000
9	-.533333	.000000	1.033209	.775543	.567107	.000000	-.102628	.935678	.725659	1.035819
10	-.533333	.000000	1.039549	.759588	.472589	.000000	-.086048	.955332	.725659	1.066407
11	-.533333	.000000	1.043292	.747014	.378072	.000000	-.069086	.971412	.725659	1.091622

12	-.533333	.000000	1.045502	.737519	.283554	.000000	-.051924	.983919	.725659	1.111349
13	-.533333	.000000	1.046806	.730882	.189036	.000000	-.034659	.992853	.725659	1.125501
14	-.533333	.000000	1.047577	.726958	.094518	.000000	-.017342	.998213	.725659	1.134017
15	-.533333	.000000	1.048031	.725659	.000000	.000000	.000000	1.000000	.725659	1.136660
16	-.533333	.000000	1.600900	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-.533333	.000000	1.600941	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-.533333	.000000	1.601044	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-.533333	.000000	1.601303	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-.533333	.000000	1.601953	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-.533333	.000000	1.603586	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-.533333	.000000	1.607687	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-.533333	.000000	1.617988	.475210	.516112	.000000	.000000	1.052166	.500000	1.416669
24	-.533333	.000000	1.643863	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-.533333	.000000	1.708859	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-.533333	.000000	1.872122	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-.533333	.000000	2.282219	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-.533333	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 15 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.266667	.000000	.000000	.722505	.780755	.000000	.000000	.878084	.634420	1.000000
2	-.266667	.000000	.414821	.722505	.780755	.000000	-.028820	.878084	.634420	1.000000
3	-.266667	.000000	.659725	.722505	.780755	.000000	-.045835	.878084	.634420	1.000000
4	-.266667	.000000	.804312	.722505	.780755	.000000	-.055880	.878084	.634420	1.000000
5	-.266667	.000000	.889674	.722505	.780755	.000000	-.061810	.878084	.634420	1.000000
6	-.266667	.000000	.940070	.722505	.780755	.000000	-.065312	.878084	.634420	1.000000
7	-.266667	.000000	.969823	.722505	.780755	.000000	-.067379	.878084	.634420	1.000000
8	-.266667	.000000	.987389	.722505	.780755	.000000	-.068599	.878084	.634420	1.000000
9	-.266667	.000000	.997759	.696836	.669218	.000000	-.059417	.910429	.634420	1.051947
10	-.266667	.000000	1.003882	.676500	.557682	.000000	-.049818	.937798	.634420	1.096484
11	-.266667	.000000	1.007497	.660723	.446145	.000000	-.039998	.960191	.634420	1.133813
12	-.266667	.000000	1.009631	.648952	.334609	.000000	-.030062	.977607	.634420	1.162196
13	-.266667	.000000	1.010891	.640798	.223073	.000000	-.020066	.990048	.634420	1.182554
14	-.266667	.000000	1.011634	.636003	.111536	.000000	-.010040	.997512	.634420	1.195459
15	-.266667	.000000	1.012073	.634420	.000000	.000000	.000000	1.000000	.634420	1.199635
16	-.266667	.000000	1.552194	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	-.266667	.000000	1.552236	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	-.266667	.000000	1.552342	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	-.266667	.000000	1.552609	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	-.266667	.000000	1.553277	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	-.266667	.000000	1.554956	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	-.266667	.000000	1.559174	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	-.266667	.000000	1.569768	.475210	.516112	.000000	.000000	1.052166	.500000	1.416669
24	-.266667	.000000	1.596380	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	-.266667	.000000	1.663226	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	-.266667	.000000	1.831134	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	-.266667	.000000	2.252902	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	-.266667	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 16 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.000000	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
2	.000000	.000000	.409873	.633938	.912871	.000000	-.008212	.833333	.528282	1.000000
3	.000000	.000000	.651855	.633938	.912871	.000000	-.013060	.833333	.528282	1.000000
4	.000000	.000000	.794717	.633938	.912871	.000000	-.015922	.833333	.528282	1.000000
5	.000000	.000000	.879060	.633938	.912871	.000000	-.017611	.833333	.528282	1.000000
6	.000000	.000000	.928855	.633938	.912871	.000000	-.018609	.833333	.528282	1.000000
7	.000000	.000000	.958254	.633938	.912871	.000000	-.019198	.833333	.528282	1.000000
8	.000000	.000000	.975610	.633938	.912871	.000000	-.019546	.833333	.528282	1.000000
9	.000000	.000000	.985857	.601996	.782461	.000000	-.016929	.877551	.528282	1.075066

10	.000000	.000000	.991906	.577379	.652051	.000000	-.014194	.914966	.528282	1.139779
11	.000000	.000000	.995478	.558686	.521641	.000000	-.011396	.945578	.528282	1.193521
12	.000000	.000000	.997586	.544964	.391230	.000000	-.008565	.969388	.528282	1.235606
13	.000000	.000000	.998831	.535568	.260820	.000000	-.005717	.986395	.528282	1.266265
14	.000000	.000000	.999566	.530085	.130410	.000000	-.002861	.996599	.528282	1.284642
15	.000000	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	.000000	.000000	1.500609	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	.000000	.000000	1.500652	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	.000000	.000000	1.500761	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	.000000	.000000	1.501035	.459905	.302158	.000000	.000000	1.087180	.500000	1.483617
20	.000000	.000000	1.501723	.462358	.346609	.000000	.000000	1.081412	.500000	1.472612
21	.000000	.000000	1.503452	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	.000000	.000000	1.507793	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	.000000	.000000	1.518698	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	.000000	.000000	1.546089	.482574	.588771	.000000	.000000	1.036110	.500000	1.386892
25	.000000	.000000	1.614894	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	.000000	.000000	1.787724	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	.000000	.000000	2.221853	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	.000000	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 17 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.283465	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
2	.283465	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
3	.283465	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
4	.283465	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
5	.283465	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
6	.283465	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
7	.283465	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
8	.283465	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
9	.283465	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075066
10	.283465	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	.283465	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	.283465	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235606
13	.283465	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	.283465	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	.283465	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	.283465	.000000	1.442593	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	.283465	.000000	1.442638	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	.283465	.000000	1.442751	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	.283465	.000000	1.443033	.459905	.302158	.000000	.000000	1.087180	.500000	1.483617
20	.283465	.000000	1.443743	.462358	.346609	.000000	.000000	1.081412	.500000	1.472612
21	.283465	.000000	1.445527	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	.283465	.000000	1.450007	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	.283465	.000000	1.461261	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	.283465	.000000	1.489530	.482574	.588771	.000000	.000000	1.036110	.500000	1.386892
25	.283465	.000000	1.560538	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	.283465	.000000	1.738903	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	.283465	.000000	2.186933	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	.283465	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 18 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.569554	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
2	.569554	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
3	.569554	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
4	.569554	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
5	.569554	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
6	.569554	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
7	.569554	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000000

8	.569554	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
9	.569554	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075C66
10	.569554	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	.569554	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	.569554	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235E06
13	.569554	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	.569554	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	.569554	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	.569554	.000000	1.380696	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	.569554	.000000	1.380742	.456233	.218045	.000000	.000000	1.095931	.500000	1.500C60
18	.569554	.000000	1.380858	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	.569554	.000000	1.381150	.459905	.302158	.000000	.000000	1.087180	.500000	1.483817
20	.569554	.000000	1.381884	.462358	.346609	.000000	.000000	1.081412	.500000	1.472812
21	.569554	.000000	1.383726	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	.569554	.000000	1.388355	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	.569554	.000000	1.399982	.475210	.516112	.000000	.000000	1.052166	.500000	1.416669
24	.569554	.000000	1.429186	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	.569554	.000000	1.502545	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	.569554	.000000	1.686814	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	.569554	.000000	2.149677	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	.569554	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 19 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.855643	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
2	.855643	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
3	.855643	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
4	.855643	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
5	.855643	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
6	.855643	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
7	.855643	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
8	.855643	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
9	.855643	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075C66
10	.855643	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	.855643	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	.855643	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235E06
13	.855643	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	.855643	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	.855643	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	.855643	.000000	1.315415	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	.855643	.000000	1.315463	.456233	.218045	.000000	.000000	1.095931	.500000	1.500C60
18	.855643	.000000	1.315583	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	.855643	.000000	1.315885	.459905	.302158	.000000	.000000	1.087180	.500000	1.483817
20	.855643	.000000	1.316643	.462358	.346609	.000000	.000000	1.081412	.500000	1.472812
21	.855643	.000000	1.318548	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	.855643	.000000	1.323333	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	.855643	.000000	1.335353	.475210	.516112	.000000	.000000	1.052166	.500000	1.416669
24	.855643	.000000	1.365544	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	.855643	.000000	1.441382	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	.855643	.000000	1.631879	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	.855643	.000000	2.110384	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	.855643	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 20 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.141732	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
2	1.141732	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
3	1.141732	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
4	1.141732	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
5	1.141732	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00

6	1.141732	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
7	1.141732	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
8	1.141732	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
9	1.141732	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075066
10	1.141732	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	1.141732	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	1.141732	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235806
13	1.141732	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	1.141732	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	1.141732	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	1.141732	.000000	1.246724	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	1.141732	.000000	1.246774	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	1.141732	.000000	1.246898	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	1.141732	.000000	1.247211	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	1.141732	.000000	1.247995	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	1.141732	.000000	1.249966	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	1.141732	.000000	1.254915	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	1.141732	.000000	1.267348	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	1.141732	.000000	1.298578	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	1.141732	.000000	1.377025	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	1.141732	.000000	1.574074	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	1.141732	.000000	2.069039	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	1.141732	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 21 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.427822	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
2	1.427822	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
3	1.427822	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
4	1.427822	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
5	1.427822	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
6	1.427822	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
7	1.427822	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
8	1.427822	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
9	1.427822	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075066
10	1.427822	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	1.427822	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	1.427822	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235806
13	1.427822	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	1.427822	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	1.427822	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	1.427822	.000000	1.174596	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	1.427822	.000000	1.174647	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	1.427822	.000000	1.174776	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	1.427822	.000000	1.175099	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	1.427822	.000000	1.175911	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	1.427822	.000000	1.177950	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	1.427822	.000000	1.183073	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	1.427822	.000000	1.195940	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	1.427822	.000000	1.228260	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	1.427822	.000000	1.309446	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	1.427822	.000000	1.513376	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	1.427822	.000000	2.025625	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	1.427822	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 22 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.713911	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
2	1.713911	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
3	1.713911	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000

4	1.713911	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
5	1.713911	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
6	1.713911	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
7	1.713911	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
8	1.713911	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
9	1.713911	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075C66
10	1.713911	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	1.713911	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	1.713911	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235E06
13	1.713911	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	1.713911	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	1.713911	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	1.713911	.000000	1.098997	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	1.713911	.000000	1.099050	.456233	.218045	.000000	.000000	1.095931	.500000	1.500C60
18	1.713911	.000000	1.099184	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	1.713911	.000000	1.099518	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	1.713911	.000000	1.100359	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	1.713911	.000000	1.102470	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	1.713911	.000000	1.107774	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	1.713911	.000000	1.121096	.475210	.516112	.000000	.000000	1.052166	.500000	1.416E69
24	1.713911	.000000	1.154560	.482574	.588771	.000000	.000000	1.036110	.500000	1.386E92
25	1.713911	.000000	1.238617	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	1.713911	.000000	1.449758	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	1.713911	.000000	1.980122	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	1.713911	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 23 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.000000	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
2	2.000000	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
3	2.000000	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
4	2.000000	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
5	2.000000	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
6	2.000000	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
7	2.000000	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
8	2.000000	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00
9	2.000000	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075C66
10	2.000000	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	2.000000	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	2.000000	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235E06
13	2.000000	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	2.000000	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	2.000000	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	2.000000	.000000	1.000525	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	2.000000	.000000	1.000580	.456233	.218045	.000000	.000000	1.095931	.500000	1.500C60
18	2.000000	.000000	1.000720	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	2.000000	.000000	1.001069	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	2.000000	.000000	1.001947	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	2.000000	.000000	1.004152	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	2.000000	.000000	1.009692	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	2.000000	.000000	1.023607	.475210	.516112	.000000	.000000	1.052166	.500000	1.416E69
24	2.000000	.000000	1.058559	.482574	.588771	.000000	.000000	1.036110	.500000	1.386E92
25	2.000000	.000000	1.146356	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	2.000000	.000000	1.366891	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	2.000000	.000000	1.920851	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	2.000000	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 24 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.283465	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000C00

2	2.283465	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
3	2.283465	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
4	2.283465	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
5	2.283465	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
6	2.283465	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
7	2.283465	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
8	2.283465	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
9	2.283465	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075066
10	2.283465	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	2.283465	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	2.283465	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235606
13	2.283465	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	2.283465	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	2.283465	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	2.283465	.000000	1.000525	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	2.283465	.000000	1.000580	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	2.283465	.000000	1.000720	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	2.283465	.000000	1.001069	.459905	.302158	.000000	.000000	1.087180	.500000	1.483617
20	2.283465	.000000	1.001947	.462358	.346609	.000000	.000000	1.081412	.500000	1.472812
21	2.283465	.000000	1.004152	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	2.283465	.000000	1.009692	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	2.283465	.000000	1.023607	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	2.283465	.000000	1.058559	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	2.283465	.000000	1.146356	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	2.283465	.000000	1.366891	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	2.283465	.000000	1.920851	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	2.283465	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 25 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.624672	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
2	2.624672	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
3	2.624672	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
4	2.624672	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
5	2.624672	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
6	2.624672	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
7	2.624672	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
8	2.624672	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
9	2.624672	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075066
10	2.624672	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	2.624672	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	2.624672	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235606
13	2.624672	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	2.624672	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	2.624672	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	2.624672	.000000	1.000525	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	2.624672	.000000	1.000580	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	2.624672	.000000	1.000720	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	2.624672	.000000	1.001069	.459905	.302158	.000000	.000000	1.087180	.500000	1.483617
20	2.624672	.000000	1.001947	.462358	.346609	.000000	.000000	1.081412	.500000	1.472812
21	2.624672	.000000	1.004152	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	2.624672	.000000	1.009692	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	2.624672	.000000	1.023607	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	2.624672	.000000	1.058559	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	2.624672	.000000	1.146356	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	2.624672	.000000	1.366891	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	2.624672	.000000	1.920851	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	2.624672	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 26 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.018373	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
2	3.018373	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
3	3.018373	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
4	3.018373	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
5	3.018373	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
6	3.018373	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
7	3.018373	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
8	3.018373	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
9	3.018373	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075066
10	3.018373	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	3.018373	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	3.018373	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235606
13	3.018373	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	3.018373	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	3.018373	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	3.018373	.000000	1.000525	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	3.018373	.000000	1.000580	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	3.018373	.000000	1.000720	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	3.018373	.000000	1.001069	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	3.018373	.000000	1.001947	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	3.018373	.000000	1.004152	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	3.018373	.000000	1.009692	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	3.018373	.000000	1.023607	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	3.018373	.000000	1.058559	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	3.018373	.000000	1.146356	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	3.018373	.000000	1.366891	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	3.018373	.000000	1.920851	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	3.018373	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 27 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.412074	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
2	3.412074	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
3	3.412074	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
4	3.412074	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
5	3.412074	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
6	3.412074	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
7	3.412074	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
8	3.412074	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
9	3.412074	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075066
10	3.412074	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	3.412074	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	3.412074	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235606
13	3.412074	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	3.412074	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	3.412074	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	3.412074	.000000	1.000525	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	3.412074	.000000	1.000580	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	3.412074	.000000	1.000720	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	3.412074	.000000	1.001069	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	3.412074	.000000	1.001947	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	3.412074	.000000	1.004152	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	3.412074	.000000	1.009692	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	3.412074	.000000	1.023607	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	3.412074	.000000	1.058559	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	3.412074	.000000	1.146356	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	3.412074	.000000	1.366891	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	3.412074	.000000	1.920851	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

	28	3.412074	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

J= 28 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.805774	.000000	.000000	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
2	3.805774	.000000	.409873	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
3	3.805774	.000000	.651855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
4	3.805774	.000000	.794717	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
5	3.805774	.000000	.879060	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
6	3.805774	.000000	.928855	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
7	3.805774	.000000	.958254	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
8	3.805774	.000000	.975610	.633938	.912871	.000000	.000000	.833333	.528282	1.000000
9	3.805774	.000000	.985857	.601996	.782461	.000000	.000000	.877551	.528282	1.075066
10	3.805774	.000000	.991906	.577379	.652051	.000000	.000000	.914966	.528282	1.139779
11	3.805774	.000000	.995478	.558686	.521641	.000000	.000000	.945578	.528282	1.193521
12	3.805774	.000000	.997586	.544964	.391230	.000000	.000000	.969388	.528282	1.235606
13	3.805774	.000000	.998831	.535568	.260820	.000000	.000000	.986395	.528282	1.266265
14	3.805774	.000000	.999566	.530085	.130410	.000000	.000000	.996599	.528282	1.284642
15	3.805774	.000000	1.000000	.528282	.000000	.000000	.000000	1.000000	.528282	1.290784
16	3.805774	.000000	1.000525	.454203	.000000	.000000	.000000	1.105440	.502094	1.515777
17	3.805774	.000000	1.000580	.456233	.218045	.000000	.000000	1.095931	.500000	1.500060
18	3.805774	.000000	1.000720	.457948	.260884	.000000	.000000	1.091828	.500000	1.492203
19	3.805774	.000000	1.001069	.459905	.302158	.000000	.000000	1.087180	.500000	1.483317
20	3.805774	.000000	1.001947	.462358	.346609	.000000	.000000	1.081412	.500000	1.472312
21	3.805774	.000000	1.004152	.465531	.396219	.000000	.000000	1.074042	.500000	1.458283
22	3.805774	.000000	1.009692	.469695	.452327	.000000	.000000	1.064520	.500000	1.440215
23	3.805774	.000000	1.023607	.475210	.516112	.000000	.000000	1.052166	.500000	1.416869
24	3.805774	.000000	1.058559	.482574	.588771	.000000	.000000	1.036110	.500000	1.386692
25	3.805774	.000000	1.146356	.492499	.671603	.000000	.000000	1.015230	.500000	1.347728
26	3.805774	.000000	1.366891	.506037	.766064	.000000	.000000	.988069	.500000	1.297521
27	3.805774	.000000	1.920851	.510204	.791960	.000000	.000000	.980000	.500000	1.282710
28	3.805774	.000000	3.312336	.510204	.791960	.000000	.000000	.980000	.500000	1.282710

FINAL FLOWFIELD OUTPUT FOR TEST CASE NO. 4

NC=500 TIME= 77.9865 DT= .2500E+00 MAXIMUM DELTAQ/Q=-5.866E-03AT J,K,L,N=28, 3,22, 2
GF=-1.6572E-01-3.4251E+00-3.3575E+01-3.3575E+01-2.4755E-03 CW= 1.0813E+00

CURRENT FLOW AT NC= 500 AS WRITTEN TO RESTART FILE

J= 1 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-9.055118	0.000000	0.000000	.973876	.229486	0.000000	0.000000	.989467	.963618	1.000000
2	-9.055118	0.000000	.691889	.973688	.230315	0.000000	0.000000	.989391	.963358	1.000000
3	-9.055118	0.000000	1.100368	.973126	.232784	0.000000	0.000000	.989162	.962579	1.000000
4	-9.055118	0.000000	1.341528	.972389	.235979	0.000000	0.000000	.988863	.961560	1.000000
5	-9.055118	0.000000	1.483905	.971877	.238176	0.000000	0.000000	.988654	.960851	1.000000
6	-9.055118	0.000000	1.567962	.972177	.236890	0.000000	0.000000	.988777	.961266	1.000000
7	-9.055118	0.000000	1.617587	.974100	.228491	0.000000	0.000000	.989558	.963929	1.000000
8	-9.055118	0.000000	1.646886	.977246	.214062	0.000000	0.000000	.990835	.968290	1.000000
9	-9.055118	0.000000	1.664183	.974414	.186789	0.000000	0.000000	.993022	.967615	1.003371
10	-9.055118	0.000000	1.674395	.971296	.164753	0.000000	0.000000	.994571	.966024	1.006225
11	-9.055118	0.000000	1.680424	.968216	.148059	0.000000	0.000000	.995616	.963971	1.008563
12	-9.055118	0.000000	1.683983	.965883	.133237	0.000000	0.000000	.996450	.962454	1.010382
13	-9.055118	0.000000	1.686085	.965179	.113133	0.000000	0.000000	.997440	.962708	1.011681
14	-9.055118	0.000000	1.687325	.966627	.077187	0.000000	0.000000	.998808	.965475	1.012462
15	-9.055118	0.000000	1.688058	.968890	0.000000	0.000000	0.000000	1.000000	.968890	1.012722
16	-9.055118	0.000000	2.000000	.452338	0.000000	0.000000	0.000000	1.105440	.500033	1.518273
17	-9.055118	0.000000	2.000031	.456232	.218016	0.000000	0.000000	1.095934	.500000	1.500065
18	-9.055118	0.000000	2.000110	.457947	.260869	0.000000	0.000000	1.091829	.500000	1.492206
19	-9.055118	0.000000	2.000309	.459905	.302153	0.000000	0.000000	1.087181	.500000	1.483318
20	-9.055118	0.000000	2.000807	.462358	.346606	0.000000	0.000000	1.081413	.500000	1.472313
21	-9.055118	0.000000	2.002059	.465531	.396217	0.000000	0.000000	1.074042	.500000	1.458284
22	-9.055118	0.000000	2.005204	.469695	.452327	0.000000	0.000000	1.064520	.500000	1.440215
23	-9.055118	0.000000	2.013103	.475210	.516112	0.000000	0.000000	1.052166	.500000	1.416869
24	-9.055118	0.000000	2.032944	.482574	.588771	0.000000	0.000000	1.036110	.500000	1.386692
25	-9.055118	0.000000	2.082783	.492499	.671603	0.000000	0.000000	1.015230	.500000	1.347728
26	-9.055118	0.000000	2.207974	.506037	.766064	0.000000	0.000000	.988069	.500000	1.297521
27	-9.055118	0.000000	2.522438	.510204	.791960	0.000000	0.000000	.980000	.500000	1.282710
28	-9.055118	0.000000	3.312336	.510204	.791960	0.000000	0.000000	.980000	.500000	1.282710

J= 2 K= 1 L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-7.742782	0.000000	0.000000	.972469	.229849	0.000000	0.000000	.989458	.962217	1.000569
2	-7.742782	0.000000	.691889	.972561	.230609	0.000000	-.000173	.989435	.962287	1.000508
3	-7.742782	0.000000	1.100368	.972839	.232888	0.000000	-.000303	.989367	.962495	1.000325
4	-7.742782	0.000000	1.341528	.973108	.235859	0.000000	-.000270	.989248	.962645	1.000094
5	-7.742782	0.000000	1.483905	.973251	.237908	0.000000	-.000322	.989115	.962657	.999900
6	-7.742782	0.000000	1.567962	.973316	.236863	0.000000	-.000232	.989151	.962756	.999911
7	-7.742782	0.000000	1.617587	.972883	.229571	0.000000	-.000235	.989541	.962708	1.000483
8	-7.742782	0.000000	1.646886	.971838	.213311	0.000000	-.000095	.990691	.962791	1.002076
9	-7.742782	0.000000	1.664183	.969969	.188732	0.000000	-.000044	.992530	.962723	1.004709
10	-7.742782	0.000000	1.674395	.968430	.165260	0.000000	-.000018	.994184	.962798	1.007024
11	-7.742782	0.000000	1.680424	.967343	.148261	0.000000	-.000008	.995229	.962727	1.008535
12	-7.742782	0.000000	1.683983	.966628	.133272	0.000000	-.000003	.996039	.962799	1.009654
13	-7.742782	0.000000	1.686085	.965700	.113347	0.000000	-.000002	.996923	.962729	1.010939
14	-7.742782	0.000000	1.687325	.964634	.077104	0.000000	-.000000	.998098	.962800	1.012578
15	-7.742782	0.000000	1.688058	.963702	0.000000	0.000000	0.000000	.998990	.962729	1.013874
16	-7.742782	0.000000	2.000000	.455575	0.000000	0.000000	0.000000	1.098318	.500366	1.504194
17	-7.742782	0.000000	2.000031	.454463	.023953	0.000000	-.000000	1.098235	.499107	1.505552
18	-7.742782	0.000000	2.000110	.455838	.066152	0.000000	.000008	1.097686	.500366	1.502983
19	-7.742782	0.000000	2.000309	.456026	.161519	0.000000	.000021	1.094471	.499107	1.498333
20	-7.742782	0.000000	2.000807	.460617	.275917	0.000000	.000051	1.086295	.500366	1.481192
21	-7.742782	0.000000	2.002059	.463213	.354565	0.000000	.000073	1.077492	.499108	1.465892
22	-7.742782	0.000000	2.005204	.468048	.415412	0.000000	.000153	1.069049	.500366	1.448377

23	-7.742782	0.000000	2.013103	.471694	.480103	0.000000	.000261	1.058138	.499118	1.429151
24	-7.742782	0.000000	2.032944	.480827	.569202	0.000000	.000768	1.040625	.500361	1.394758
25	-7.742782	0.000000	2.082783	.492072	.672891	0.000000	.001046	1.014415	.499165	1.347113
26	-7.742782	0.000000	2.207974	.504907	.757442	0.000000	.001218	.990848	.500286	1.302335
27	-7.742782	0.000000	2.522438	.510097	.793141	0.000000	.002199	.979434	.499606	1.282077
28	-7.742782	0.000000	3.312336	.510204	.791960	0.000000	.000577	.980000	.500000	1.282710

J= 3 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-6.430446	0.000000	0.000000	.971087	.231166	0.000000	0.000000	.989114	.960516	1.000791
2	-6.430446	0.000000	.691889	.971270	.231725	0.000000	-.001584	.989103	.960686	1.000704
3	-6.430446	0.000000	1.100368	.971820	.233401	0.000000	-.001761	.989069	.961197	1.000443
4	-6.430446	0.000000	1.341528	.972039	.235923	0.000000	-.001364	.988832	.961182	1.000113
5	-6.430446	0.000000	1.483905	.972251	.237238	0.000000	-.001069	.988713	.961277	.999905
6	-6.430446	0.000000	1.567962	.972050	.234595	0.000000	-.000755	.988885	.961245	1.000162
7	-6.430446	0.000000	1.617587	.971270	.224486	0.000000	-.000486	.989721	.961287	1.001329
8	-6.430446	0.000000	1.646886	.969742	.205440	0.000000	-.000248	.991239	.961246	1.003497
9	-6.430446	0.000000	1.664183	.968142	.181565	0.000000	-.000112	.992914	.961282	1.005817
10	-6.430446	0.000000	1.674395	.966843	.159853	0.000000	-.000050	.994209	.961244	1.007709
11	-6.430446	0.000000	1.680424	.966076	.144025	0.000000	-.000028	.995035	.961280	1.008867
12	-6.430446	0.000000	1.683983	.965384	.129620	0.000000	-.000011	.995711	.961243	1.009841
13	-6.430446	0.000000	1.686085	.964625	.110065	0.000000	-.000006	.996531	.961279	1.010992
14	-6.430446	0.000000	1.687325	.963496	.074410	0.000000	.000000	.997661	.961243	1.012612
15	-6.430446	0.000000	1.688058	.962695	0.000000	0.000000	0.000000	.998528	.961278	1.013829
16	-6.430446	0.000000	2.000000	.453850	0.000000	0.000000	0.000000	1.097429	.498069	1.505260
17	-6.430446	0.000000	2.000031	.453475	.022162	0.000000	.000000	1.097359	.497624	1.505662
18	-6.430446	0.000000	2.000110	.454074	.061370	0.000000	.000000	1.096888	.498069	1.504221
19	-6.430446	0.000000	2.000309	.454835	.151615	0.000000	.000000	1.094076	.497624	1.499359
20	-6.430446	0.000000	2.000807	.458424	.264639	0.000000	.000002	1.086479	.498069	1.484275
21	-6.430446	0.000000	2.002059	.461554	.343165	0.000000	.000006	1.078152	.497625	1.468896
22	-6.430446	0.000000	2.005204	.465447	.403707	0.000000	.000020	1.070089	.498069	1.453020
23	-6.430446	0.000000	2.013103	.469500	.467901	0.000000	.000044	1.059920	.497632	1.434230
24	-6.430446	0.000000	2.032944	.478017	.561271	0.000000	.000157	1.041970	.498080	1.399838
25	-6.430446	0.000000	2.082783	.490560	.672768	0.000000	.000400	1.014585	.497715	1.348998
26	-6.430446	0.000000	2.207974	.502777	.756297	0.000000	.000285	.990991	.498247	1.304726
27	-6.430446	0.000000	2.522438	.509281	.794933	0.000000	.000464	.978873	.498522	1.282163
28	-6.430446	0.000000	3.312336	.510204	.791960	0.000000	-.000861	.980000	.500000	1.282710

J= 4 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-5.118110	0.000000	0.000000	.970893	.238917	0.000000	0.000000	.988189	.959426	.999934
2	-5.118110	0.000000	691889	.971182	.238202	0.000000	-.005031	.988324	.959843	.999952
3	-5.118110	0.000000	1.100368	.972050	.236057	0.000000	-.005801	.988730	.961095	1.000006
4	-5.118110	0.000000	1.341528	.972038	.235369	0.000000	-.004938	.988654	.961009	.999933
5	-5.118110	0.000000	1.483905	.972228	.234000	0.000000	-.004255	.988784	.961323	.999987
6	-5.118110	0.000000	1.567962	.971719	.228164	0.000000	-.003570	.989239	.961262	1.000656
7	-5.118110	0.000000	1.617587	.970688	.214252	0.000000	-.002959	.990453	.961420	1.002310
8	-5.118110	0.000000	1.646886	.969010	.192952	0.000000	-.002388	.992069	.961325	1.004641
9	-5.118110	0.000000	1.664183	.967648	.170131	0.000000	-.001962	.993586	.961442	1.006743
10	-5.118110	0.000000	1.674395	.966590	.152233	0.000000	-.001685	.994566	.961338	1.008176
11	-5.118110	0.000000	1.680424	.966023	.138397	0.000000	-.001507	.995261	.961445	1.009118
12	-5.118110	0.000000	1.683983	.965297	.124171	0.000000	-.001333	.995901	.961340	1.010071
13	-5.118110	0.000000	1.686085	.964655	.104915	0.000000	-.001121	.996672	.961445	1.011122
14	-5.118110	0.000000	1.687325	.963559	.070220	0.000000	-.000745	.997698	.961341	1.012623
15	-5.118110	0.000000	1.688058	.962933	0.000000	0.000000	0.000000	.998454	.961445	1.013654
16	-5.118110	0.000000	2.000000	.450496	0.000000	0.000000	0.000000	1.097857	.494580	1.510322
17	-5.118110	0.000000	2.000031	.450118	.022820	0.000000	-.000187	1.097782	.494132	1.510726
18	-5.118110	0.000000	2.000110	.450731	.063114	0.000000	-.000517	1.097284	.494580	1.509218
19	-5.118110	0.000000	2.000309	.451538	.155261	0.000000	-.001273	1.094329	.494132	1.504077
20	-5.118110	0.000000	2.000807	.455206	.269176	0.000000	-.002207	1.086497	.494580	1.488488
21	-5.118110	0.000000	2.002059	.458388	.348019	0.000000	-.002860	1.077979	.494132	1.472710
22	-5.118110	0.000000	2.005204	.462322	.408807	0.000000	-.003361	1.069777	.494582	1.456516
23	-5.118110	0.000000	2.013103	.466416	.473261	0.000000	-.003929	1.059451	.494145	1.437379
24	-5.118110	0.000000	2.032944	.474962	.566945	0.000000	-.004696	1.041385	.494618	1.402645
25	-5.118110	0.000000	2.082783	.487729	.679892	0.000000	-.005619	1.013512	.494319	1.350696
26	-5.118110	0.000000	2.207974	.500360	.762781	0.000000	-.006269	.989710	.495211	1.305554
27	-5.118110	0.000000	2.522438	.507598	.800277	0.000000	-.007244	.977433	.496143	1.281974

28	-5.118110	0.000000	3.312336	.510204	.791960	0.000000	-.006580	.980000	.500000	1.282710

J= 5 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-4.068241	0.000000	0.000000	.971818	.256886	0.000000	0.000000	.986197	.958404	.997538
2	-4.068241	0.000000	.681615	.972240	.253588	0.000000	-.010659	.986682	.959292	.997856
3	-4.068241	0.000000	1.084029	.972507	.243696	0.000000	-.012736	.988138	.961959	.998808
4	-4.068241	0.000000	1.321608	.973066	.236463	0.000000	-.011291	.988621	.961994	.999477
5	-4.068241	0.000000	1.461870	.973142	.230470	0.000000	-.010048	.989234	.962665	1.000066
6	-4.068241	0.000000	1.544679	.972332	.220943	0.000000	-.008766	.990006	.962614	1.001180
7	-4.068241	0.000000	1.593568	.971208	.204095	0.000000	-.007611	.991474	.962927	1.003128
8	-4.068241	0.000000	1.622431	.969496	.181843	0.000000	-.006481	.993066	.962773	1.005449
9	-4.068241	0.000000	1.639472	.968357	.160365	0.000000	-.005594	.994457	.962990	1.007330
10	-4.068241	0.000000	1.649532	.967375	.144698	0.000000	-.004977	.995280	.962809	1.008573
11	-4.068241	0.000000	1.655472	.966958	.132128	0.000000	-.004520	.995909	.963002	1.009385
12	-4.068241	0.000000	1.658978	.966193	.118435	0.000000	-.004031	.996507	.962818	1.010310
13	-4.068241	0.000000	1.661048	.965677	.099749	0.000000	-.003391	.997233	.963005	1.011263
14	-4.068241	0.000000	1.662271	.964580	.066063	0.000000	-.002240	.998175	.962820	1.012678
15	-4.068241	0.000000	1.662992	.964119	0.000000	0.000000	0.000000	.998845	.963005	1.013551
16	-4.068241	0.000000	1.980640	.444620	0.000000	0.000000	0.000000	1.096863	.487687	1.516900
17	-4.068241	0.000000	1.980672	.443871	.023993	0.000000	-.000806	1.096780	.486828	1.517808
18	-4.068241	0.000000	1.980752	.444876	.066335	0.000000	-.002228	1.096230	.487687	1.515674
19	-4.068241	0.000000	1.980954	.445407	.162434	0.000000	-.005457	1.092996	.486829	1.510483
20	-4.068241	0.000000	1.981460	.449599	.278237	0.000000	-.009344	1.084715	.487687	1.493431
21	-4.068241	0.000000	1.982730	.452521	.357978	0.000000	-.012022	1.075823	.486832	1.477356
22	-4.068241	0.000000	1.985921	.456943	.419674	0.000000	-.014065	1.067306	.487698	1.459972
23	-4.068241	0.000000	1.993936	.460827	.485221	0.000000	-.016246	1.056530	.486877	1.440346
24	-4.068241	0.000000	2.014071	.469880	.579622	0.000000	-.019162	1.038190	.487824	1.404372
25	-4.068241	0.000000	2.064645	.482661	.692710	0.000000	-.022455	1.009768	.487376	1.351340
26	-4.068241	0.000000	2.191682	.496405	.774923	0.000000	-.023558	.985989	.489450	1.304781
27	-4.068241	0.000000	2.510785	.505040	.809526	0.000000	-.023204	.974283	.492051	1.280427
28	-4.068241	0.000000	3.312336	.510204	.791960	0.000000	-.017499	.980000	.500000	1.282710

J= 6 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-3.280840	0.000000	0.000000	.973311	.283906	0.000000	0.000000	.983015	.956780	.993710
2	-3.280840	0.000000	.666339	.973712	.277155	0.000000	-.017151	.983973	.958107	.994515
3	-3.280840	0.000000	1.059734	.974914	.256900	0.000000	-.020724	.986848	.962092	.996928
4	-3.280840	0.000000	1.291988	.973597	.240740	0.000000	-.018505	.988152	.962061	.998785
5	-3.280840	0.000000	1.429108	.973340	.228974	0.000000	-.016522	.989362	.962986	1.000113
6	-3.280840	0.000000	1.510060	.972196	.216136	0.000000	-.014537	.990400	.962863	1.001635
7	-3.280840	0.000000	1.557854	.971104	.198223	0.000000	-.012827	.991961	.963298	1.003664
8	-3.280840	0.000000	1.586070	.969432	.177080	0.000000	-.011214	.993419	.963052	1.005832
9	-3.280840	0.000000	1.602729	.968496	.157526	0.000000	-.009945	.994702	.963365	1.007521
10	-3.280840	0.000000	1.612563	.967477	.142876	0.000000	-.009004	.995469	.963093	1.008722
11	-3.280840	0.000000	1.618370	.967154	.130655	0.000000	-.008234	.996097	.963379	1.009493
12	-3.280840	0.000000	1.621798	.966309	.117176	0.000000	-.007377	.996682	.963103	1.010439
13	-3.280840	0.000000	1.623822	.965887	.098615	0.000000	-.006209	.997407	.963382	1.011351
14	-3.280840	0.000000	1.625016	.964717	.065061	0.000000	-.004095	.998330	.963105	1.012777
15	-3.280840	0.000000	1.625722	.964367	0.000000	0.000000	0.000000	.998979	.963382	1.013583
16	-3.280840	0.000000	1.938270	.440361	0.000000	0.000000	0.000000	1.095654	.482483	1.521072
17	-3.280840	0.000000	1.938303	.439341	.024748	0.000000	-.001633	1.095565	.481326	1.522361
18	-3.280840	0.000000	1.938386	.440633	.068418	0.000000	-.004516	1.094978	.482483	1.519758
19	-3.280840	0.000000	1.938594	.440955	.166791	0.000000	-.011008	1.091556	.481327	1.514567
20	-3.280840	0.000000	1.939116	.445473	.282308	0.000000	-.018624	1.083082	.482484	1.496694
21	-3.280840	0.000000	1.940426	.448134	.361659	0.000000	-.023845	1.074082	.481333	1.480725
22	-3.280840	0.000000	1.943719	.452868	.423638	0.000000	-.027856	1.065434	.482501	1.462641
23	-3.280840	0.000000	1.951989	.456565	.489922	0.000000	-.032088	1.054403	.481403	1.442798
24	-3.280840	0.000000	1.972764	.466033	.585730	0.000000	-.037758	1.035749	.482693	1.405685
25	-3.280840	0.000000	2.024948	.479002	.700715	0.000000	-.043904	1.006536	.482133	1.351121
26	-3.280840	0.000000	2.156027	.493765	.784539	0.000000	-.045656	.982274	.485013	1.302640
27	-3.280840	0.000000	2.485283	.503497	.818172	0.000000	-.042954	.970869	.488830	1.277503
28	-3.280840	0.000000	3.312336	.510204	.791960	0.000000	-.030490	.980000	.500000	1.282710

J= 7 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2.650919	0.000000	0.000000	.974584	.316668	0.000000	0.000000	.978942	.954061	.989075
2	-2.650919	0.000000	.645038	.974962	.306037	0.000000	-.023810	.980473	.955924	.990468

3	-2.650919	0.000000	1.025858	.976096	.274143	0.000000	-.028934	.985065	.961518	.994644
4	-2.650919	0.000000	1.250688	.973900	.247935	0.000000	-.025763	.987424	.961653	.997925
5	-2.650919	0.000000	1.383424	.973293	.230118	0.000000	-.022866	.989279	.962858	1.000049
6	-2.650919	0.000000	1.461789	.971918	.214721	0.000000	-.020215	.990569	.962751	1.001920
7	-2.650919	0.000000	1.508055	.971020	.197816	0.000000	-.018144	.992034	.963285	1.003772
8	-2.650919	0.000000	1.535369	.969561	.180413	0.000000	-.016355	.993244	.963011	1.005602
9	-2.650919	0.000000	1.551495	.968868	.164411	0.000000	-.014933	.994324	.963388	1.006974
10	-2.650919	0.000000	1.561016	.967806	.150227	0.000000	-.013665	.995115	.963078	1.008226
11	-2.650919	0.000000	1.566636	.967441	.136798	0.000000	-.012464	.995839	.963415	1.009111
12	-2.650919	0.000000	1.569955	.966483	.122268	0.000000	-.011142	.996495	.963096	1.010177
13	-2.650919	0.000000	1.571914	.966052	.102848	0.000000	-.009378	.997278	.963422	1.011151
14	-2.650919	0.000000	1.573070	.964772	.068009	0.000000	-.006201	.998268	.963100	1.012692
15	-2.650919	0.000000	1.573753	.964421	0.000000	0.000000	0.000000	.998965	.963423	1.013546
16	-2.650919	0.000000	1.887087	.440135	0.000000	0.000000	0.000000	1.096176	.482467	1.522107
17	-2.650919	0.000000	1.887121	.438873	.025133	0.000000	-.002260	1.096084	.481042	1.523731
18	-2.650919	0.000000	1.887207	.440418	.069481	0.000000	-.006249	1.095476	.482467	1.520746
19	-2.650919	0.000000	1.887422	.440531	.168614	0.000000	-.015164	1.091960	.481042	1.515710
20	-2.650919	0.000000	1.887963	.445272	.282172	0.000000	-.025367	1.083532	.482467	1.497586
21	-2.650919	0.000000	1.889323	.447631	.360099	0.000000	-.032354	1.074651	.481048	1.482174
22	-2.650919	0.000000	1.892738	.452581	.421662	0.000000	-.037786	1.066065	.482481	1.463878
23	-2.650919	0.000000	1.901317	.456035	.487960	0.000000	-.043549	1.054987	.481111	1.444268
24	-2.650919	0.000000	1.922865	.465802	.584903	0.000000	-.051370	1.036159	.482645	1.406519
25	-2.650919	0.000000	1.976993	.478941	.702779	0.000000	-.059930	1.005950	.481791	1.350404
26	-2.650919	0.000000	2.112954	.494364	.789389	0.000000	-.062524	.980724	.484834	1.299955
27	-2.650919	0.000000	2.454475	.504030	.823546	0.000000	-.058742	.968792	.488301	1.274230
28	-2.650919	0.000000	3.312336	.510204	.791960	0.000000	-.041022	.980000	.500000	1.282710

J= 8 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-2.204724	0.000000	0.000000	.973235	.351021	0.000000	0.000000	.974230	.948155	.984859
2	-2.204724	0.000000	.626105	.973935	.336430	0.000000	-.031293	.976404	.950955	.986774
3	-2.204724	0.000000	.995746	.976035	.292657	0.000000	-.038334	.982928	.959373	.992512
4	-2.204724	0.000000	1.213977	.973613	.255943	0.000000	-.033704	.986443	.960413	.997051
5	-2.204724	0.000000	1.342817	.972917	.232298	0.000000	-.029222	.988872	.962091	.999792
6	-2.204724	0.000000	1.418881	.971537	.214914	0.000000	-.025561	.990341	.962152	1.001846
7	-2.204724	0.000000	1.463789	.970829	.198439	0.000000	-.022859	.991759	.962828	1.003573
8	-2.204724	0.000000	1.490302	.969528	.182623	0.000000	-.020617	.992831	.962578	1.005197
9	-2.204724	0.000000	1.505954	.969013	.167893	0.000000	-.018799	.993810	.963015	1.006402
10	-2.204724	0.000000	1.515195	.967952	.153994	0.000000	-.017141	.994563	.962689	1.007606
11	-2.204724	0.000000	1.520651	.967627	.140281	0.000000	-.015578	.995284	.963064	1.008472
12	-2.204724	0.000000	1.523872	.966639	.125300	0.000000	-.013882	.995945	.962719	1.009554
13	-2.204724	0.000000	1.525774	.966231	.105316	0.000000	-.011662	.996736	.963077	1.010527
14	-2.204724	0.000000	1.526896	.964910	.069563	0.000000	-.007693	.997737	.962727	1.012095
15	-2.204724	0.000000	1.527559	.964588	0.000000	0.000000	0.000000	.998435	.963079	1.012938
16	-2.204724	0.000000	1.841483	.439968	0.000000	0.000000	0.000000	1.096113	.482254	1.522254
17	-2.204724	0.000000	1.841518	.438522	.025548	0.000000	-.002795	1.096018	.480627	1.524128
18	-2.204724	0.000000	1.841607	.440259	.070610	0.000000	-.007724	1.095388	.482254	1.520844
19	-2.204724	0.000000	1.841829	.440224	.170504	0.000000	-.018651	1.091781	.480628	1.515885
20	-2.204724	0.000000	1.842388	.445130	.282275	0.000000	-.030866	1.083402	.482254	1.497597
21	-2.204724	0.000000	1.843791	.447248	.358850	0.000000	-.039215	1.074647	.480634	1.482676
22	-2.204724	0.000000	1.847315	.452348	.419939	0.000000	-.045764	1.066147	.482270	1.464293
23	-2.204724	0.000000	1.856168	.455588	.485803	0.000000	-.052707	1.055131	.480705	1.445031
24	-2.204724	0.000000	1.878406	.465541	.583262	0.000000	-.062220	1.036320	.482449	1.407054
25	-2.204724	0.000000	1.934266	.478895	.703565	0.000000	-.072653	1.005346	.481455	1.349644
26	-2.204724	0.000000	2.074578	.495053	.792893	0.000000	-.075515	.979342	.484826	1.297399
27	-2.204724	0.000000	2.427026	.505052	.827304	0.000000	-.069820	.967300	.488537	1.271238
28	-2.204724	0.000000	3.312336	.510204	.791960	0.000000	-.048233	.980000	.500000	1.282710

J= 9 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.837270	0.000000	0.000000	.968139	.389308	0.000000	0.000000	.968642	.937781	.981270
2	-1.837270	0.000000	.608139	.969554	.370293	0.000000	-.041347	.971553	.941973	.983643
3	-1.837270	0.000000	.967174	.973799	.313246	0.000000	-.051587	.980284	.954600	.990751
4	-1.837270	0.000000	1.179143	.972000	.263280	0.000000	-.045793	.985029	.957448	.996283
5	-1.837270	0.000000	1.304286	.971785	.231578	0.000000	-.039504	.988005	.960128	.999380
6	-1.837270	0.000000	1.378168	.970667	.210565	0.000000	-.034355	.989631	.960602	1.001487
7	-1.837270	0.000000	1.421787	.970206	.192702	0.000000	-.030466	.991045	.961518	1.003109

8	-1.837270	0.000000	1.447539	.969051	.176590	0.000000	-.027282	.992042	.961339	1.004596
9	-1.837270	0.000000	1.462742	.968685	.161910	0.000000	-.024701	.992945	.961851	1.005663
10	-1.837270	0.000000	1.471718	.967686	.148207	0.000000	-.022423	.993628	.961520	1.006769
11	-1.837270	0.000000	1.477017	.967452	.134796	0.000000	-.020314	.994295	.961933	1.007543
12	-1.837270	0.000000	1.480146	.966483	.120181	0.000000	-.018065	.994911	.961565	1.008571
13	-1.837270	0.000000	1.481993	.966139	.100611	0.000000	-.015110	.995666	.961952	1.009480
14	-1.837270	0.000000	1.483083	.964841	.065731	0.000000	-.009864	.996615	.961575	1.010986
15	-1.837270	0.000000	1.483727	.964594	0.000000	0.000000	0.000000	.997263	.961954	1.011747
16	-1.837270	0.000000	1.798071	.440040	0.000000	0.000000	0.000000	1.096195	.482369	1.522268
17	-1.837270	0.000000	1.798107	.438660	.026001	0.000000	-.003227	1.096096	.480813	1.524044
18	-1.837270	0.000000	1.798198	.440342	.071846	0.000000	-.008917	1.095441	.482369	1.520803
19	-1.837270	0.000000	1.798427	.440412	.172589	0.000000	-.021420	1.091735	.480814	1.515560
20	-1.837270	0.000000	1.799002	.445248	.282765	0.000000	-.035082	1.083372	.482369	1.497397
21	-1.837270	0.000000	1.800447	.447389	.358116	0.000000	-.044402	1.074723	.480820	1.482595
22	-1.837270	0.000000	1.804075	.452404	.418795	0.000000	-.051794	1.066266	.482383	1.464384
23	-1.837270	0.000000	1.813190	.455668	.484123	0.000000	-.059605	1.055347	.480888	1.445226
24	-1.837270	0.000000	1.836084	.465564	.581804	0.000000	-.070492	1.036487	.482551	1.407253
25	-1.837270	0.000000	1.893592	.479238	.703982	0.000000	-.082482	1.004954	.481612	1.348732
26	-1.837270	0.000000	2.038046	.495751	.796055	0.000000	-.085998	.977987	.484838	1.294875
27	-1.837270	0.000000	2.400896	.506057	.830757	0.000000	-.078448	.965916	.488809	1.268409
28	-1.837270	0.000000	3.312336	.510204	.791960	0.000000	-.053626	.980000	.500000	1.282710

J= 10 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.533333	0.000000	0.000000	.961689	.439031	0.000000	0.000000	.960058	.922277	.975178
2	-1.533333	0.000000	.584795	.963232	.415390	0.000000	-.054538	.964080	.928633	.978635
3	-1.533333	0.000000	.930048	.967862	.344468	0.000000	-.072219	.976146	.944775	.988984
4	-1.533333	0.000000	1.133879	.967668	.280536	0.000000	-.070346	.983072	.951287	.996081
5	-1.533333	0.000000	1.254218	.969170	.239252	0.000000	-.065748	.987057	.956626	.999499
6	-1.533333	0.000000	1.325265	.969203	.213027	0.000000	-.061031	.989170	.958707	1.001625
7	-1.533333	0.000000	1.367209	.969492	.192803	0.000000	-.056657	.990823	.960594	1.003179
8	-1.533333	0.000000	1.391972	.968692	.176044	0.000000	-.052575	.991947	.960891	1.004649
9	-1.533333	0.000000	1.406592	.968583	.161765	0.000000	-.048877	.992914	.961719	1.005673
10	-1.533333	0.000000	1.415224	.967649	.149058	0.000000	-.045441	.993641	.961495	1.006798
11	-1.533333	0.000000	1.420319	.967482	.136877	0.000000	-.041965	.994364	.962029	1.007600
12	-1.533333	0.000000	1.423328	.966432	.123498	0.000000	-.038042	.995060	.961658	1.008744
13	-1.533333	0.000000	1.425104	.966029	.105152	0.000000	-.032457	.995942	.962109	1.009806
14	-1.533333	0.000000	1.426153	.964468	.071044	0.000000	-.021994	.997124	.961694	1.011659
15	-1.533333	0.000000	1.426772	.964001	0.000000	0.000000	0.000000	.998049	.962121	1.012794
16	-1.533333	0.000000	1.758147	.439883	0.000000	0.000000	0.000000	1.096246	.482220	1.522556
17	-1.533333	0.000000	1.758184	.438639	.026536	0.000000	-.003608	1.096143	.480812	1.524138
18	-1.533333	0.000000	1.758278	.440199	.073302	0.000000	-.009966	1.095459	.482220	1.521026
19	-1.533333	0.000000	1.758513	.440451	.175141	0.000000	-.023811	1.091635	.480812	1.515369
20	-1.533333	0.000000	1.759103	.445160	.284060	0.000000	-.038605	1.083253	.482220	1.497350
21	-1.533333	0.000000	1.760586	.447412	.358467	0.000000	-.048684	1.074666	.480818	1.482485
22	-1.533333	0.000000	1.764310	.452286	.418842	0.000000	-.056739	1.066219	.482236	1.464472
23	-1.533333	0.000000	1.773664	.455665	.483787	0.000000	-.065222	1.055362	.480892	1.445250
24	-1.533333	0.000000	1.797162	.465456	.581407	0.000000	-.077141	1.036440	.482417	1.407321
25	-1.533333	0.000000	1.856187	.479486	.704906	0.000000	-.090280	1.004511	.481649	1.347858
26	-1.533333	0.000000	2.004449	.496340	.798987	0.000000	-.094218	.976747	.484799	1.292618
27	-1.533333	0.000000	2.376866	.506946	.833850	0.000000	-.085067	.964701	.489051	1.265925
28	-1.533333	0.000000	3.312336	.510204	.791960	0.000000	-.057583	.980000	.500000	1.282710

J= 11 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.300000	0.000000	0.000000	.964009	.502179	0.000000	0.000000	.947347	.913251	.961339
2	-1.300000	0.000000	.539934	.962194	.477578	0.000000	-.062654	.952118	.916122	.966910
3	-1.300000	0.000000	.858703	.956748	.403774	0.000000	-.089891	.966432	.924631	.983676
4	-1.300000	0.000000	1.046899	.953712	.337454	0.000000	-.099320	.975639	.930479	.994311
5	-1.300000	0.000000	1.158006	.955101	.292963	0.000000	-.103470	.981040	.936992	.999233
6	-1.300000	0.000000	1.223602	.955554	.264225	0.000000	-.104318	.984066	.940329	1.002126
7	-1.300000	0.000000	1.262329	.956265	.243349	0.000000	-.103188	.986339	.943201	1.004142
8	-1.300000	0.000000	1.285193	.955612	.227192	0.000000	-.100889	.987936	.944083	1.006042
9	-1.300000	0.000000	1.298691	.955600	.214365	0.000000	-.098060	.989264	.945341	1.007399
10	-1.300000	0.000000	1.306661	.954544	.202957	0.000000	-.094666	.990344	.945328	1.008946
11	-1.300000	0.000000	1.311365	.954168	.190946	0.000000	-.090054	.991495	.946053	1.010278
12	-1.300000	0.000000	1.314143	.952648	.176102	0.000000	-.083680	.992752	.945743	1.012203

13	-1.300000	0.000000	1.315783	.951647	.154570	0.000000	-.073695	.994379	.946298	1.014288
14	-1.300000	0.000000	1.316751	.948900	.112163	0.000000	-.053659	.996821	.945884	1.017956
15	-1.300000	0.000000	1.317323	.947065	0.000000	0.000000	0.000000	.999276	.946379	1.021253
16	-1.300000	0.000000	1.725018	.439832	0.000000	0.000000	0.000000	1.096139	.482117	1.522478
17	-1.300000	0.000000	1.725056	.438678	.026855	0.000000	-.003937	1.096033	.480806	1.523930
18	-1.300000	0.000000	1.725152	.440157	.074175	0.000000	-.010874	1.095331	.482117	1.520906
19	-1.300000	0.000000	1.725392	.440526	.176550	0.000000	-.025879	1.091436	.480806	1.514989
20	-1.300000	0.000000	1.725995	.445138	.284324	0.000000	-.041661	1.083072	.482117	1.497130
21	-1.300000	0.000000	1.727509	.447454	.357969	0.000000	-.052406	1.074554	.480813	1.482276
22	-1.300000	0.000000	1.731313	.452228	.418131	0.000000	-.061037	1.066130	.482134	1.464426
23	-1.300000	0.000000	1.740867	.455677	.482835	0.000000	-.070078	1.055328	.480889	1.445189
24	-1.300000	0.000000	1.764865	.465380	.580414	0.000000	-.082785	1.036405	.482322	1.407363
25	-1.300000	0.000000	1.825148	.479691	.705366	0.000000	-.096828	1.004107	.481662	1.347086
26	-1.300000	0.000000	1.976570	.496847	.801324	0.000000	-.100795	.975687	.484767	1.290688
27	-1.300000	0.000000	2.356926	.507727	.836319	0.000000	-.090029	.963727	.489310	1.263868
28	-1.300000	0.000000	3.212336	.510204	.791960	0.000000	-.060442	.980000	.500000	1.282710

J= 12 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-1.066667	0.000000	0.000000	.969692	.569843	0.000000	0.000000	.933631	.905335	.945196
2	-1.066667	0.000000	.493246	.962606	.547638	0.000000	-.058203	.938279	.903193	.952693
3	-1.066667	0.000000	.784450	.941348	.481024	0.000000	-.087962	.952223	.896373	.975526
4	-1.066667	0.000000	.956372	.929926	.425466	0.000000	-.105682	.961323	.893959	.989669
5	-1.066667	0.000000	1.057872	.926842	.390631	0.000000	-.118551	.966190	.895506	.996002
6	-1.066667	0.000000	1.117796	.925077	.368404	0.000000	-.126422	.968838	.896250	.999494
7	-1.066667	0.000000	1.153174	.924479	.352699	0.000000	-.130641	.970858	.897538	1.001837
8	-1.066667	0.000000	1.174061	.923199	.340729	0.000000	-.132314	.972364	.897685	1.003947
9	-1.066667	0.000000	1.186392	.922521	.330269	0.000000	-.131939	.973887	.898432	1.005815
10	-1.066667	0.000000	1.193672	.920628	.317313	0.000000	-.128917	.975722	.898277	1.008538
11	-1.066667	0.000000	1.197970	.918961	.300112	0.000000	-.123066	.978083	.898820	1.011711
12	-1.066667	0.000000	1.200507	.916009	.277195	0.000000	-.114430	.980940	.898560	1.015974
13	-1.066667	0.000000	1.202085	.913064	.244113	0.000000	-.100961	.984613	.899014	1.021092
14	-1.066667	0.000000	1.202890	.907603	.180655	0.000000	-.074886	.990173	.898684	1.029326
15	-1.066667	0.000000	1.203412	.902368	0.000000	0.000000	0.000000	.996390	.899111	1.038188
16	-1.066667	0.000000	1.689730	.440422	0.000000	0.000000	0.000000	1.096264	.482818	1.521836
17	-1.066667	0.000000	1.689769	.439392	.026969	0.000000	-.004222	1.096157	.481643	1.523112
18	-1.066667	0.000000	1.689866	.440750	.074484	0.000000	-.011660	1.095446	.482818	1.520246
19	-1.066667	0.000000	1.690112	.441254	.176700	0.000000	-.027658	1.091532	.481643	1.514122
20	-1.066667	0.000000	1.690728	.445707	.282930	0.000000	-.044266	1.083264	.482818	1.496631
21	-1.066667	0.000000	1.692276	.448096	.355583	0.000000	-.055574	1.074378	.481649	1.481872
22	-1.066667	0.000000	1.696164	.452717	.415384	0.000000	-.064709	1.066523	.482833	1.464332
23	-1.066667	0.000000	1.705930	.456252	.479820	0.000000	-.074232	1.055815	.481718	1.445127
24	-1.066667	0.000000	1.730463	.465848	.577836	0.000000	-.087674	1.036821	.483001	1.407362
25	-1.066667	0.000000	1.792085	.480427	.704399	0.000000	-.102668	1.004186	.482438	1.346367
26	-1.066667	0.000000	1.946874	.497793	.802806	0.000000	-.107168	.974859	.485278	1.288612
27	-1.066667	0.000000	2.335685	.508819	.838553	0.000000	-.094886	.962811	.489897	1.261583
28	-1.066667	0.000000	3.312336	.510204	.791960	0.000000	-.063119	.980000	.500000	1.282710

J= 13 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.800000	0.000000	0.000000	.955090	.652324	0.000000	0.000000	.914363	.873299	.931325
2	-.800000	0.000000	.454948	.944961	.632110	0.000000	-.048237	.919217	.868624	.940270
3	-.800000	0.000000	.723542	.914576	.571469	0.000000	-.076575	.933778	.854011	.967734
4	-.800000	0.000000	.882115	.898041	.524972	0.000000	-.096576	.943577	.847371	.985051
5	-.800000	0.000000	.975734	.890817	.499700	0.000000	-.110948	.948000	.844495	.992871
6	-.800000	0.000000	1.031005	.886691	.484769	0.000000	-.120316	.950162	.842501	.996985
7	-.800000	0.000000	1.063636	.884275	.474195	0.000000	-.125861	.951826	.841676	.999822
8	-.800000	0.000000	1.082901	.881769	.463860	0.000000	-.128183	.953601	.840856	1.002824
9	-.800000	0.000000	1.094275	.879311	.450574	0.000000	-.127513	.956111	.840719	1.006587
10	-.800000	0.000000	1.100990	.875916	.432331	0.000000	-.124141	.959396	.840350	1.011610
11	-.800000	0.000000	1.104954	.872443	.409104	0.000000	-.118469	.963372	.840487	1.017417
12	-.800000	0.000000	1.107295	.867807	.377783	0.000000	-.109783	.968316	.840312	1.024821
13	-.800000	0.000000	1.108676	.862369	.332397	0.000000	-.096749	.974667	.840523	1.034140
14	-.800000	0.000000	1.109492	.853849	.246499	0.000000	-.071782	.984215	.840371	1.048425
15	-.800000	0.000000	1.109974	.844739	0.000000	0.000000	0.000000	.995079	.840582	1.064555
16	-.800000	0.000000	1.646740	.441015	0.000000	0.000000	0.000000	1.096422	.483539	1.521235
17	-.800000	0.000000	1.646780	.440205	.026939	0.000000	-.004487	1.096314	.482604	1.522204

18	-.800000	0.000000	1.646880	.441344	.074393	0.000000	-.012390	1.095604	.483538	1.519646
19	-.800000	0.000000	1.647132	.442058	.175841	0.000000	-.029283	1.091721	.482604	1.513283
20	-.800000	0.000000	1.647765	.446210	.279928	0.000000	-.046602	1.083656	.483538	1.496496
21	-.800000	0.000000	1.649354	.448720	.351072	0.000000	-.058399	1.075522	.482609	1.481935
22	-.800000	0.000000	1.653345	.453037	.410121	0.000000	-.068055	1.067354	.483551	1.465059
23	-.800000	0.000000	1.663370	.456691	.473696	0.000000	-.078277	1.056892	.482673	1.446044
24	-.800000	0.000000	1.688552	.466198	.573955	0.000000	-.093315	1.037583	.483720	1.407974
25	-.800000	0.000000	1.751607	.481458	.703807	0.000000	-.109257	1.004134	.483448	1.345142
26	-.800000	0.000000	1.910697	.499100	.804725	0.000000	-.113845	.973924	.486086	1.286026
27	-.800000	0.000000	2.309810	.510252	.840973	0.000000	-.099653	.961876	.490799	1.258941
28	-.800000	0.000000	3.312336	.510204	.791960	0.000000	-.065626	.980000	.500000	1.282710

J= 14 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.533333	0.000000	0.000000	.919410	.737747	0.000000	0.000000	.890950	.819148	.921403
2	-.533333	0.000000	.429559	.907164	.720649	0.000000	-.033824	.895551	.812412	.931142
3	-.533333	0.000000	.683164	.870426	.669355	0.000000	-.056970	.909354	.791526	.961259
4	-.533333	0.000000	.832888	.849253	.632515	0.000000	-.075392	.919166	.780605	.981248
5	-.533333	0.000000	.921283	.838336	.615383	0.000000	-.088045	.923016	.773797	.990471
6	-.533333	0.000000	.973470	.832341	.606658	0.000000	-.096433	.924535	.769528	.994954
7	-.533333	0.000000	1.004280	.828634	.601057	0.000000	-.101615	.925594	.766979	.997874
8	-.533333	0.000000	1.022470	.825751	.594757	0.000000	-.104332	.926942	.765423	1.000721
9	-.533333	0.000000	1.033209	.823177	.586927	0.000000	-.105300	.928796	.764564	1.003975
10	-.533333	0.000000	1.039549	.819499	.572290	0.000000	-.104168	.932355	.764064	1.009629
11	-.533333	0.000000	1.043292	.810297	.527108	0.000000	-.096566	.942701	.763868	1.025454
12	-.533333	0.000000	1.045502	.798187	.452236	0.000000	-.082971	.956887	.763776	1.047174
13	-.533333	0.000000	1.046806	.788102	.372768	0.000000	-.068418	.969129	.763772	1.065979
14	-.533333	0.000000	1.047577	.777986	.263553	0.000000	-.048357	.981717	.763762	1.085420
15	-.533333	0.000000	1.048031	.768881	0.000000	0.000000	0.000000	.993387	.763796	1.103506
16	-.533333	0.000000	1.600900	.441979	0.000000	0.000000	0.000000	1.096261	.484525	1.519685
17	-.533333	0.000000	1.600941	.441694	.028042	0.000000	-.004971	1.096145	.484161	1.519915
18	-.533333	0.000000	1.601044	.442338	.077413	0.000000	-.013723	1.095371	.484524	1.517956
19	-.533333	0.000000	1.601303	.443683	.181384	0.000000	-.032151	1.091230	.484161	1.510382
20	-.533333	0.000000	1.601953	.447414	.284873	0.000000	-.050486	1.082944	.484524	1.493902
21	-.533333	0.000000	1.603586	.450519	.355815	0.000000	-.063019	1.074680	.484164	1.478406
22	-.533333	0.000000	1.607687	.454565	.417361	0.000000	-.073797	1.065938	.484536	1.461138
23	-.533333	0.000000	1.617988	.458708	.479517	0.000000	-.084504	1.055618	.484221	1.441757
24	-.533333	0.000000	1.643863	.467116	.571270	0.000000	-.099492	1.037651	.484703	1.406959
25	-.533333	0.000000	1.708859	.482686	.700877	0.000000	-.116015	1.004695	.484952	1.344523
26	-.533333	0.000000	1.872122	.500566	.805797	0.000000	-.120259	.973079	.487090	1.283404
27	-.533333	0.000000	2.282219	.511916	.843287	0.000000	-.104043	.960947	.491924	1.256088
28	-.533333	0.000000	3.312336	.510204	.791960	0.000000	-.067692	.980000	.500000	1.282710

J= 15 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	-.266667	0.000000	0.000000	.871475	.817290	0.000000	0.000000	.866938	.755515	.915980
2	-.266667	0.000000	.414821	.858773	.802821	0.000000	-.018126	.871239	.748196	.925947
3	-.266667	0.000000	.659725	.820666	.759412	0.000000	-.032892	.884142	.725585	.956875
4	-.266667	0.000000	.804312	.797099	.729605	0.000000	-.045089	.893809	.712454	.978679
5	-.266667	0.000000	.889674	.783816	.717956	0.000000	-.052739	.897073	.703140	.988876
6	-.266667	0.000000	.940070	.776868	.713234	0.000000	-.057584	.898070	.697682	.993508
7	-.266667	0.000000	.969823	.772187	.710465	0.000000	-.060655	.898613	.693898	.996515
8	-.266667	0.000000	.987389	.768989	.705787	0.000000	-.062113	.899894	.692008	.999593
9	-.266667	0.000000	.997759	.765548	.698639	0.000000	-.062899	.901967	.690499	1.003695
10	-.266667	0.000000	1.003882	.758030	.669962	0.000000	-.060755	.910298	.690033	1.016972
11	-.266667	0.000000	1.007497	.742712	.596578	0.000000	-.053934	.928305	.689463	1.045593
12	-.266667	0.000000	1.009631	.728965	.510164	0.000000	-.045992	.945949	.689563	1.073458
13	-.266667	0.000000	1.010891	.718616	.432436	0.000000	-.038944	.959180	.689282	1.094715
14	-.266667	0.000000	1.011634	.707930	.321515	0.000000	-.028944	.973971	.689503	1.118278
15	-.266667	0.000000	1.012073	.695614	0.000000	0.000000	0.000000	.990891	.689277	1.145721
16	-.266667	0.000000	1.552194	.443934	0.000000	0.000000	0.000000	1.096334	.486701	1.517105
17	-.266667	0.000000	1.552236	.443852	.028878	0.000000	-.005430	1.096210	.486556	1.517045
18	-.266667	0.000000	1.552342	.444318	.079695	0.000000	-.014985	1.095387	.486700	1.515269
19	-.266667	0.000000	1.552608	.445948	.185179	0.000000	-.034816	1.091059	.486555	1.507074
20	-.266667	0.000000	1.553277	.449518	.287318	0.000000	-.054004	1.082713	.486700	1.490783
21	-.266667	0.000000	1.554956	.452844	.357517	0.000000	-.067135	1.074448	.486557	1.475048
22	-.266667	0.000000	1.559174	.456730	.418968	0.000000	-.078484	1.065642	.486711	1.457966

23	-.266667	0.000000	1.569768	.461075	.480402	0.000000	-.089447	1.055381	.486610	1.438470
24	-.266667	0.000000	1.596380	.468937	.567796	0.000000	-.104087	1.038220	.486860	1.405541
25	-.266667	0.000000	1.663226	.484408	.696867	0.000000	-.121468	1.005666	.487153	1.343906
26	-.266667	0.000000	1.831134	.502602	.806195	0.000000	-.125728	.972687	.488875	1.280805
27	-.266667	0.000000	2.252902	.513947	.845252	0.000000	-.107440	.960220	.493503	1.253151
28	-.266667	0.000000	3.312336	.510204	.791960	0.000000	-.069175	.980000	.500000	1.282710

J= 16 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	0.000000	0.000000	0.000000	.818919	.883451	0.000000	0.000000	.844824	.691842	.915103
2	0.000000	0.000000	.409873	.808167	.869103	0.000000	-.003048	.849277	.686358	.924803
3	0.000000	0.000000	.651855	.775914	.826060	0.000000	-.008881	.862638	.669333	.954780
4	0.000000	0.000000	.794717	.755287	.794317	0.000000	-.013950	.873759	.659939	.977567
5	0.000000	0.000000	.879060	.743504	.780637	0.000000	-.016136	.877944	.652755	.988447
6	0.000000	0.000000	.928855	.737841	.774841	0.000000	-.017343	.879441	.648888	.993165
7	0.000000	0.000000	.958254	.733997	.771690	0.000000	-.018098	.880060	.645961	.995943
8	0.000000	0.000000	.975610	.731944	.769194	0.000000	-.018442	.880800	.644696	.997898
9	0.000000	0.000000	.985857	.727612	.758412	0.000000	-.018530	.884384	.643488	1.004340
10	0.000000	0.000000	.991906	.712662	.696678	0.000000	-.016418	.902614	.643259	1.033590
11	0.000000	0.000000	.995478	.694115	.599440	0.000000	-.013629	.925975	.642733	1.071585
12	0.000000	0.000000	.997586	.681374	.511515	0.000000	-.011382	.943550	.642911	1.100046
13	0.000000	0.000000	.998831	.671703	.433578	0.000000	-.009608	.956642	.642580	1.121705
14	0.000000	0.000000	.999566	.661526	.318191	0.000000	-.006984	.971766	.642848	1.146418
15	0.000000	0.000000	1.000000	.650342	0.000000	0.000000	0.000000	.988031	.642558	1.173583
16	0.000000	0.000000	1.500609	.446364	0.000000	0.000000	0.000000	1.096303	.489350	1.513753
17	0.000000	0.000000	1.500652	.446683	.029143	0.000000	-.005806	1.096176	.489644	1.513144
18	0.000000	0.000000	1.500761	.446759	.080413	0.000000	-.016019	1.095333	.489350	1.511879
19	0.000000	0.000000	1.501035	.448814	.185710	0.000000	-.036989	1.090971	.489643	1.503096
20	0.000000	0.000000	1.501723	.451948	.285732	0.000000	-.056887	1.082755	.489349	1.487630
21	0.000000	0.000000	1.503452	.455621	.354745	0.000000	-.070530	1.074672	.489643	1.471751
22	0.000000	0.000000	1.507793	.459078	.415550	0.000000	-.082352	1.065958	.489358	1.455410
23	0.000000	0.000000	1.518698	.463768	.476571	0.000000	-.093644	1.055881	.489684	1.435803
24	0.000000	0.000000	1.546089	.471072	.561729	0.000000	-.108252	1.039114	.489497	1.404198
25	0.000000	0.000000	1.614894	.486730	.691272	0.000000	-.126166	1.006968	.490121	1.343076
26	0.000000	0.000000	1.787724	.505092	.805036	0.000000	-.130682	.972460	.491182	1.277979
27	0.000000	0.000000	2.221853	.516441	.846786	0.000000	-.110288	.959618	.495586	1.249943
28	0.000000	0.000000	3.312336	.510204	.791960	0.000000	-.070055	.980000	.500000	1.282710

J= 17 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.283465	0.000000	0.000000	.783903	.920696	0.000000	0.000000	.831006	.651428	.916008
2	.283465	0.000000	.409873	.776798	.904175	0.000000	.004127	.836384	.649701	.925300
3	.283465	0.000000	.651855	.755483	.854611	0.000000	.001348	.852516	.644061	.953702
4	.283465	0.000000	.794717	.741004	.815392	0.000000	-.001553	.866532	.642104	.976914
5	.283465	0.000000	.879060	.732933	.795710	0.000000	-.001797	.872918	.639791	.988434
6	.283465	0.000000	.928855	.729768	.786572	0.000000	-.002357	.875627	.639005	.993220
7	.283465	0.000000	.958254	.727650	.781531	0.000000	-.002269	.876891	.638070	.995811
8	.283465	0.000000	.975610	.725633	.774964	0.000000	-.002660	.879100	.637904	.999428
9	.283465	0.000000	.985857	.716253	.740704	0.000000	-.002016	.889995	.637461	1.017093
10	.283465	0.000000	.991906	.697889	.653344	0.000000	-.000882	.913516	.637532	1.054877
11	.283465	0.000000	.995478	.682470	.561957	0.000000	-.000314	.933779	.637276	1.087955
12	.283465	0.000000	.997586	.673759	.497091	0.000000	-.000089	.946111	.637451	1.108001
13	.283465	0.000000	.998831	.665904	.431623	0.000000	-.000054	.956950	.637237	1.125964
14	.283465	0.000000	.999566	.655363	.310494	0.000000	.000001	.972648	.637437	1.151763
15	.283465	0.000000	1.000000	.644838	0.000000	0.000000	0.000000	.988205	.637232	1.177787
16	.283465	0.000000	1.442593	.450297	0.000000	0.000000	0.000000	1.096553	.493774	1.508795
17	.283465	0.000000	1.442638	.450606	.028763	0.000000	-.006056	1.096429	.494058	1.508209
18	.283465	0.000000	1.442751	.450686	.079386	0.000000	-.016712	1.095604	.493774	1.506968
19	.283465	0.000000	1.443033	.452697	.182673	0.000000	-.038448	1.091363	.494057	1.498463
20	.283465	0.000000	1.443743	.455719	.279754	0.000000	-.058843	1.083501	.493772	1.483715
21	.283465	0.000000	1.445527	.459266	.347019	0.000000	-.072864	1.075749	.494053	1.468538
22	.283465	0.000000	1.450007	.462629	.407010	0.000000	-.085093	1.067323	.493774	1.452790
23	.283465	0.000000	1.461261	.467225	.467190	0.000000	-.096691	1.057478	.494080	1.43[illegible]8
24	.283465	0.000000	1.489530	.474338	.552.31	0.000000	-.111429	1.041171	.493867	1.403094
25	.283465	0.000000	1.560538	.489890	.683240	0.000000	-.129829	1.009125	.494360	1.342473
26	.283465	0.000000	1.738902	.508707	.803244	0.000000	-.134183	.973011	.494978	1.275060
27	.283465	0.000000	2.186933	.519626	.847814	0.000000	-.111520	.959306	.498480	1.246467

	28	.283465	0.000000	3.312336	.510204	.791960	0.000000	-.070159	.980000	.500000	1.282710

J= 18 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.569554	0.000000	0.000000	.773506	.929684	0.000000	0.000000	.827518	.640090	.917048
2	.569554	0.000000	.409873	.768417	.912394	0.000000	.003785	.833353	.640362	.925956
3	.569554	0.000000	.651855	.753148	.860527	0.000000	.000764	.850858	.640822	.953026
4	.569554	0.000000	.794717	.740869	.817930	0.000000	-.001428	.866022	.641609	.976410
5	.569554	0.000000	.879060	.734023	.795162	0.000000	-.001501	.873535	.641195	.988545
6	.569554	0.000000	.928855	.731835	.784905	0.000000	-.001948	.876701	.641601	.993313
7	.569554	0.000000	.958254	.730484	.780167	0.000000	-.001914	.877881	.641278	.995385
8	.569554	0.000000	.975610	.727437	.768142	0.000000	-.002143	.882028	.641620	1.001762
9	.569554	0.000000	.985857	.712754	.709514	0.000000	-.001145	.899764	.641310	1.030274
10	.569554	0.000000	.991906	.694271	.611748	0.000000	-.000343	.924161	.641619	1.069390
11	.569554	0.000000	.995478	.681293	.528913	0.000000	-.000114	.941318	.641313	1.097496
12	.569554	0.000000	.997586	.674026	.469958	0.000000	-.000051	.951922	.641620	1.114630
13	.569554	0.000000	.998831	.666869	.407651	0.000000	-.000022	.961684	.641317	1.130879
14	.569554	0.000000	.999566	.657534	.291966	0.000000	.000002	.975798	.641620	1.153964
15	.569554	0.000000	1.000000	.648139	0.000000	0.000000	0.000000	.989474	.641317	1.176894
16	.569554	0.000000	1.380696	.455087	0.000000	0.000000	0.000000	1.096789	.499134	1.502746
17	.569554	0.000000	1.380742	.456212	.027376	0.000000	-.006085	1.096676	.500317	1.501107
18	.569554	0.000000	1.380858	.455446	.075642	0.000000	-.016811	1.095922	.499133	1.501082
19	.569554	0.000000	1.381150	.458146	.174355	0.000000	-.038737	1.092042	.500315	1.492237
20	.569554	0.000000	1.381884	.460127	.267587	0.000000	-.059402	1.084767	.499130	1.479740
21	.569554	0.000000	1.383726	.464278	.332479	0.000000	-.073632	1.077604	.500308	1.464699
22	.569554	0.000000	1.388355	.466660	.391248	0.000000	-.086186	1.069569	.499126	1.450803
23	.569554	0.000000	1.399982	.471863	.451012	0.000000	-.097933	1.060271	.500303	1.431826
24	.569554	0.000000	1.429186	.478081	.536052	0.000000	-.113020	1.044091	.499161	1.402613
25	.569554	0.000000	1.502545	.494331	.670373	0.000000	-.131322	1.012167	.500345	1.341667
26	.569554	0.000000	1.686814	.512922	.797922	0.000000	-.136880	.973845	.499507	1.271947
27	.569554	0.000000	2.149677	.523583	.848163	0.000000	-.111809	.959240	.502242	1.242605
28	.569554	0.000000	3.312336	.510204	.791960	0.000000	-.069267	.980000	.500000	1.282710

J= 19 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	.855643	0.000000	0.000000	.770853	.930627	0.000000	0.000000	.827297	.637724	.918063
2	.855643	0.000000	.409873	.765824	.914436	0.000000	.003147	.832803	.637781	.926597
3	.855643	0.000000	.651855	.750737	.865862	0.000000	.000626	.849323	.637618	.952527
4	.855643	0.000000	.794717	.737820	.823490	0.000000	-.000792	.864224	.637642	.975992
5	.855643	0.000000	.879060	.730694	.799973	0.000000	-.001236	.872020	.637180	.988626
6	.855643	0.000000	.928855	.728438	.790125	0.000000	-.001437	.875085	.637445	.993330
7	.855643	0.000000	.958254	.726817	.784575	0.000000	-.001716	.876560	.637098	.995891
8	.855643	0.000000	.975610	.720678	.760894	0.000000	-.001423	.884459	.637410	1.008281
9	.855643	0.000000	.985857	.703584	.687627	0.000000	-.000410	.905481	.637082	1.042205
10	.855643	0.000000	.991906	.687850	.599161	0.000000	.000032	.926628	.637382	1.076237
11	.855643	0.000000	.995478	.677893	.534980	0.000000	.000069	.939782	.637072	1.097899
12	.855643	0.000000	.997586	.671243	.481554	0.000000	.000023	.949545	.637375	1.113689
13	.855643	0.000000	.998831	.663615	.416190	0.000000	.000011	.960007	.637075	1.131118
14	.855643	0.000000	.999566	.653981	.299074	0.000000	-.000000	.974608	.637375	1.155058
15	.855643	0.000000	1.000000	.644195	0.000000	0.000000	0.000000	.988948	.637075	1.179144
16	.855643	0.000000	1.315415	.462284	0.000000	0.000000	0.000000	1.097386	.507303	1.494156
17	.855643	0.000000	1.315463	.463996	.025013	0.000000	-.005856	1.097291	.509139	1.491819
18	.855643	0.000000	1.315583	.462590	.069228	0.000000	-.016207	1.096657	.507302	1.492769
19	.855643	0.000000	1.315885	.465659	.160870	0.000000	-.037644	1.093365	.509135	1.484356
20	.855643	0.000000	1.316643	.466701	.249077	0.000000	-.058222	1.086985	.507297	1.474376
21	.855643	0.000000	1.318543	.471113	.311101	0.000000	-.072495	1.080677	.509121	1.460312
22	.855643	0.000000	1.323333	.472598	.367673	0.000000	-.085089	1.073396	.507284	1.448650
23	.855643	0.000000	1.335353	.478047	.427032	0.000000	-.097034	1.064894	.509069	1.430599
24	.855643	0.000000	1.365544	.483405	.512162	0.000000	-.112047	1.049334	.507253	1.403425
25	.855643	0.000000	1.441382	.499998	.654443	0.000000	-.131328	1.017372	.508684	1.342432
26	.855643	0.000000	1.631879	.519090	.792416	0.000000	-.134717	.976290	.506783	1.269059
27	.855643	0.000000	2.110384	.528289	.847207	0.000000	-.109047	.959780	.507041	1.238862
28	.855643	0.000000	3.312336	.510204	.791960	0.000000	-.067273	.980000	.500000	1.282710

J= 20 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.141732	0.000000	0.000000	.764537	.935429	0.000000	0.000000	.825456	.631092	.919040
2	1.141732	0.000000	.409873	.759514	.920399	0.000000	.003510	.830606	.630857	.927216

3	1.141732	0.000000	.651855	.744443	.875312	0.000000	.001541	.846057	.629841	.952067
4	1.141732	0.000000	.794717	.731539	.833388	0.000000	.000087	.860830	.629731	.975490
5	1.141732	0.000000	.879060	.724337	.809400	0.000000	-.000799	.868886	.629366	.988522
6	1.141732	0.000000	.928855	.722022	.799896	0.000000	-.001092	.871906	.629535	.993229
7	1.141732	0.000000	.958254	.719806	.792267	0.000000	-.001532	.874262	.629298	.997138
8	1.141732	0.000000	.975610	.710768	.757687	0.000000	-.001042	.885674	.629509	1.015273
9	1.141732	0.000000	.985857	.693285	.678426	0.000000	-.000344	.907690	.629288	1.050927
10	1.141732	0.000000	.991906	.679241	.596775	0.000000	-.000094	.926767	.629499	1.081835
11	1.141732	0.000000	.995478	.670354	.538131	0.000000	-.000032	.938740	.629288	1.101599
12	1.141732	0.000000	.997586	.663861	.486434	0.000000	-.000012	.948236	.629497	1.117083
13	1.141732	0.000000	.998831	.656305	.420810	0.000000	-.000006	.958835	.629288	1.134754
14	1.141732	0.000000	.999566	.646489	.302802	0.000000	.000000	.973715	.629496	1.159330
15	1.141732	0.000000	1.000000	.636653	0.000000	0.000000	0.000000	.988433	.629288	1.184094
16	1.141732	0.000000	1.246724	.471983	0.000000	0.000000	0.000000	1.096399	.517482	1.480465
17	1.141732	0.000000	1.246774	.473424	.021246	0.000000	-.005229	1.096330	.519029	1.478569
18	1.141732	0.000000	1.246898	.472210	.059065	0.000000	-.014532	1.095868	.517480	1.479463
19	1.141732	0.000000	1.247211	.474711	.139825	0.000000	-.034382	1.093347	.519024	1.472944
20	1.141732	0.000000	1.247995	.475557	.222196	0.000000	-.054537	1.088136	.517471	1.464880
21	1.141732	0.000000	1.249965	.479281	.279801	0.000000	-.068381	1.082878	.519003	1.453260
22	1.141732	0.000000	1.254915	.480562	.334215	0.000000	-.080873	1.076720	.517431	1.443455
23	1.141732	0.000000	1.267348	.485310	.390640	0.000000	-.092334	1.069238	.518912	1.427798
24	1.141732	0.000000	1.298578	.490342	.478122	0.000000	-.107631	1.054823	.517224	1.402749
25	1.141732	0.000000	1.377025	.506411	.624141	0.000000	-.126916	1.023184	.518152	1.343237
26	1.141732	0.000000	1.574074	.525397	.779659	0.000000	-.134522	.978983	.514355	1.266426
27	1.141732	0.000000	2.069039	.534154	.846250	0.000000	-.105071	.960328	.512963	1.234107
28	1.141732	0.000000	3.312336	.510204	.791960	0.000000	-.064045	.980000	.500000	1.282710

J= 21 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.427822	0.000000	0.000000	.755136	.944491	0.000000	0.000000	.822002	.620723	.919735
2	1.427822	0.000000	.409873	.750349	.930196	0.000000	.003946	.826975	.620520	.927656
3	1.427822	0.000000	.651855	.735990	.887312	0.000000	.002216	.841892	.619625	.951717
4	1.427822	0.000000	.794717	.723347	.845956	0.000000	.000576	.856617	.619632	.975097
5	1.427822	0.000000	.879060	.716086	.821903	0.000000	-.000457	.864831	.619293	.988429
6	1.427822	0.000000	.928855	.713677	.812444	0.000000	-.000861	.867942	.619430	.993322
7	1.427822	0.000000	.958254	.710607	.801676	0.000000	-.001271	.871396	.619220	.998996
8	1.427822	0.000000	.975610	.699739	.757997	0.000000	-.000780	.885170	.619388	1.021062
9	1.427822	0.000000	.985857	.682427	.676163	0.000000	-.000285	.907355	.619203	1.057194
10	1.427822	0.000000	.991906	.668947	.597608	0.000000	-.000100	.925900	.619378	1.087445
11	1.427822	0.000000	.995478	.660269	.540904	0.000000	-.000043	.937804	.619203	1.107194
12	1.427822	0.000000	.997586	.653710	.489774	0.000000	-.000014	.947478	.619376	1.123092
13	1.427822	0.000000	.998831	.646073	.423859	0.000000	-.000007	.958409	.619202	1.141401
14	1.427822	0.000000	.999566	.636090	.304972	0.000000	.000002	.973724	.619376	1.165886
15	1.427822	0.000000	1.000000	.626186	0.000000	0.000000	0.000000	.988846	.619202	1.192470
16	1.427822	0.000000	1.174596	.481874	0.000000	0.000000	0.000000	1.100683	.530390	1.473971
17	1.427822	0.000000	1.174647	.487581	.015249	0.000000	-.003937	1.100646	.536654	1.466996
18	1.427822	0.000000	1.174776	.482008	.042598	0.000000	-.010993	1.100376	.530390	1.473396
19	1.427822	0.000000	1.175099	.488352	.104861	0.000000	-.027020	1.098897	.536649	1.463739
20	1.427822	0.000000	1.175911	.484476	.178864	0.000000	-.045898	1.094763	.530387	1.462889
21	1.427822	0.000000	1.177950	.492085	.234685	0.000000	-.059527	1.090510	.536623	1.448150
22	1.427822	0.000000	1.183073	.489050	.289035	0.000000	-.072085	1.084494	.530372	1.443730
23	1.427822	0.000000	1.195940	.497371	.346421	0.000000	-.082651	1.078603	.536465	1.426230
24	1.427822	0.000000	1.228260	.498304	.435888	0.000000	-.096920	1.064014	.530202	1.405885
25	1.427822	0.000000	1.309446	.518118	.601557	0.000000	-.112449	1.032519	.534967	1.343156
26	1.427822	0.000000	1.513376	.575098	.768443	0.000000	-.119942	.983972	.526522	1.263600
27	1.427822	0.000000	2.005525	.540406	.842660	0.000000	-.096734	.962027	.519789	1.230641
28	1.427822	0.000000	3.3123	.510304	.791960	0.000000	-.059379	.980000	.500000	1.282710

J= 22 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	1.713911	0.000000	0.000000	.755136	.956195	0.000000	0.000000	.817829	.608207	.920676
2	1.713911	0.000000	.409873	.739926	.941717	0.000000	.004172	.822586	.608078	.928260
3	1.713911	0.000000	.651855	.728956	.901284	0.000000	.002891	.836854	.607436	.951282
4	1.713911	0.000000	.794717	.718477	.861061	0.000000	.001334	.851322	.607392	.974414
5	1.713911	0.000000	.879060	.706101	.836853	0.000000	.000176	.859676	.607062	.988043
6	1.713911	0.000000	.928855	.703610	.827207	0.000000	-.000322	.862938	.607172	.993223
7	1.713911	0.000000	.958254	.699712	.813606	0.000000	-.000741	.867474	.606982	1.000666

8	1.713911	0.000000	.975610	.686527	.762861	0.000000	-.000190	.884349	.607130	1.027924
9	1.713911	0.000000	.985857	.667901	.679355	0.000000	.000037	908766	.606966	1.067990
10	1.713911	0.000000	.991906	.654471	.603069	0.000000	.000016	.927652	.607122	1.099079
11	1.713911	0.000000	.995478	.646176	.547460	0.000000	.000003	.939321	.606966	1.118598
12	1.713911	0.000000	.997586	.639929	.496316	0.000000	-.000007	.948729	.607119	1.134199
13	1.713911	0.000000	.998831	.632676	.429539	0.000000	-.000002	.959363	.606966	1.152154
14	1.713911	0.000000	.999566	.623212	.308866	0.000000	-.000011	.974176	.607118	1.177018
15	1.713911	0.000000	1.000000	.614218	0.000000	0.000000	0.000000	.988196	.606968	1.200919
16	1.713911	0.000000	1.098997	.483811	0.000000	0.000000	0.000000	1.108851	.536474	1.482529
17	1.713911	0.000000	1.099050	.488564	-.000543	0.000000	.000165	1.108847	.541742	1.476737
18	1.713911	0.000000	1.099184	.483834	-.000749	0.000000	.000234	1.108792	.536472	1.482420
19	1.713911	0.000000	1.099518	.488701	.003882	0.000000	-.001128	1.108510	.541729	1.476123
20	1.713911	0.000000	1.100359	.485033	.036317	0.000000	-.010745	1.106016	.536454	1.477246
21	1.713911	0.000000	1.102470	.492098	.113048	0.000000	-.033194	1.100710	.541657	1.461680
22	1.713911	0.000000	1.107774	.490447	.179753	0.000000	-.051476	1.093714	.536408	1.454344
23	1.713911	0.000000	1.121096	.497724	.247542	0.000000	-.066527	1.087788	.541418	1.437966
24	1.713911	0.000000	1.154560	.498453	.334317	0.000000	-.080573	1.076119	.536395	1.421708
25	1.713911	0.000000	1.238617	.516485	.537674	0.000000	-.108844	1.044725	.539585	1.360752
26	1.713911	0.000000	1.449758	.540987	.754290	0.000000	-.111620	.988088	.534543	1.263342
27	1.713911	0.000000	1.980122	.548040	.842632	0.000000	-.086186	.962351	.527407	1.224077
28	1.713911	0.000000	3.312336	.510204	.791960	0.000000	-.053583	.980000	.500000	1.282710

J= 23 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.000000	0.000000	0.000000	.730778	.969129	0.000000	0.000000	.812359	.593654	.920946
2	2.000000	0.000000	.409873	.726387	.956346	0.000000	.004260	.816973	.593439	.928412
3	2.000000	0.000000	.651855	.713214	.917998	0.000000	.003086	.830816	.592550	.951080
4	2.000000	0.000000	.794717	.700668	.879551	0.000000	.001545	.844944	.592025	.974143
5	2.000000	0.000000	.879060	.693440	.856040	0.000000	.000228	.853291	.591706	.987856
6	2.000000	0.000000	.928855	.690510	.846480	0.000000	-.000529	.856661	.591533	.993439
7	2.000000	0.000000	.958254	.685316	.828385	0.000000	-.000907	.863035	.591452	1.003857
8	2.000000	0.000000	.975610	.671487	.773278	0.000000	-.000873	.880702	.591380	1.032794
9	2.000000	0.000000	.985857	.658450	.697765	0.000000	-.000814	.898171	.591400	1.061573
10	2.000000	0.000000	.991906	.649430	.623770	0.000000	-.000406	.910593	.591366	1.082210
11	2.000000	0.000000	.995478	.643479	.565119	0.000000	-.000187	.919042	.591384	1.096280
12	2.000000	0.000000	.997586	.638607	.511027	0.000000	.000155	.926026	.591367	1.107974
13	2.000000	0.000000	.998831	.633524	.443160	0.000000	.000150	.933449	.591362	1.120431
14	2.000000	0.000000	.999566	.627361	.319666	0.000000	.000235	.942626	.591367	1.135879
15	2.000000	0.000000	1.000000	.627361	0.000000	0.000000	0.000000	.942626	.591367	1.135879
16	2.000000	0.000000	1.000525	.500482	0.000000	0.000000	0.000000	1.121598	.561340	1.479387
17	2.000000	0.000000	1.000580	.500482	-.006750	0.000000	.003278	1.121598	.561340	1.479387
18	2.000000	0.000000	1.000719	.500469	-.017695	0.000000	.002921	1.121372	.561212	1.479105
19	2.000000	0.000000	1.001069	.501390	-.037440	0.000000	.008239	1.119661	.561386	1.475762
20	2.000000	0.000000	1.001947	.503352	-.023644	0.000000	.003135	1.114830	.561152	1.467102
21	2.000000	0.000000	1.004152	.506334	.034395	0.000000	-.005916	1.108637	.561341	1.455508
22	2.000000	0.000000	1.009692	.508236	.089146	0.000000	-.018781	1.103587	.560883	1.446707
23	2.000000	0.000000	1.023607	.511231	.161554	0.000000	-.031200	1.097231	.560938	1.434998
24	2.000000	0.000000	1.058559	.514482	.257418	0.000000	-.049505	1.087529	.559514	1.418707
25	2.000000	0.000000	1.146356	.526941	.469537	0.000000	-.081862	1.057750	.557372	1.366716
26	2.000000	0.000000	1.366891	.550614	.725260	0.000000	-.100069	.995580	.548181	1.263972
27	2.000000	0.000000	1.920851	.555972	.840347	0.000000	-.072849	.963530	.535696	1.218553
28	2.000000	0.000000	3.312336	.510204	.791960	0.000000	-.046291	.980000	.500000	1.282710

J= 24 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.283465	0.000000	0.000000	.712804	.989325	0.000000	0.000000	.804659	.573564	.921348
2	2.283465	0.000000	.409873	.708351	.977557	0.000000	.005272	.809010	.573063	.928655
3	2.283465	0.000000	.651855	.694993	.942254	0.000000	.005345	.822062	.571327	.950851
4	2.283465	0.000000	.794717	.682379	.905782	0.000000	.004004	.835726	.570282	.973764
5	2.283465	0.000000	.879060	.675035	.883367	0.000000	.003096	.843990	.569723	.987659
6	2.283465	0.000000	.928855	.671752	.873869	0.000000	.002361	.847424	.569253	.993613
7	2.283465	0.000000	.958254	.666785	.866997	0.000000	.002158	.853507	.569106	1.003721
8	2.283465	0.000000	.975610	.652831	.800268	0.000000	.001809	.871420	.568890	1.033492
9	2.283465	0.000000	.985857	.630578	.697524	0.000000	.002202	.902206	.568911	1.084951
10	2.283465	0.000000	.991906	.607676	.598112	0.000000	.002639	.936005	.568788	1.142377
11	2.283465	0.000000	.995478	.589463	.521333	0.000000	.002981	.965054	.568864	1.192255
12	2.283465	0.000000	.997586	.576166	.466122	0.000000	.003139	.987142	.568757	1.230724

13	2.283465	0.000000	.998831	.567530	.429515	0.000000	.003186	1.002315	.568844	1.257213
14	2.283465	0.000000	.999566	.561953	.406751	0.000000	.003092	1.012044	.558721	1.274440
15	2.283465	0.000000	1.000000	.558037	.390264	0.000000	.002922	1.019296	.568805	1.287168
16	2.283465	0.000000	1.000525	.554994	.379267	0.000000	.002331	1.024311	.568485	1.296332
17	2.283465	0.000000	1.000580	.554653	.375320	0.000000	.002429	1.026259	.569217	1.299117
18	2.283465	0.000000	1.000719	.552496	.371561	0.000000	.002165	1.028114	.568028	1.303496
19	2.283465	0.000000	1.001069	.551416	.362213	0.000000	.001996	1.032742	.569470	1.310388
20	2.283465	0.000000	1.001947	.543944	.339521	0.000000	.001029	1.044085	.567924	1.332030
21	2.283465	0.000000	1.004152	.532070	.289032	0.000000	-.000757	1.070389	.569522	1.377698
22	2.283465	0.000000	1.009692	.526612	.279714	0.000000	-.004860	1.076471	.566883	1.391253
23	2.283465	0.000000	1.023607	.526136	.280073	0.000000	-.011871	1.080283	.568376	1.396685
24	2.283465	0.000000	1.058559	.525277	.344399	0.000000	-.026024	1.080377	.567497	1.397718
25	2.283465	0.000000	1.146356	.537736	.516586	0.000000	-.046510	1.052788	.566122	1.349314
26	2.283465	0.000000	1.366891	.556852	.729568	0.000000	-.069185	.997595	.555513	1.260835
27	2.283465	0.000000	1.920851	.557697	.837805	0.000000	-.053999	.965167	.538271	1.219111
28	2.283465	0.000000	3.312336	.510204	.791960	0.000000	-.037644	.980000	.500000	1.282710

J= 25 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	2.624672	0.000000	0.000000	.690313	1.013853	0.000000	0.000000	.794794	.548656	.921799
2	2.624672	0.000000	.409873	.686342	1.002466	0.000000	.006827	.799073	.548437	.928902
3	2.624672	0.000000	.651855	.674431	.968303	0.000000	.007452	.811909	.547577	.950456
4	2.624672	0.000000	.794717	.663126	.932633	0.000000	.006500	.825627	.547495	.973073
5	2.624672	0.000000	.879060	.656092	.910486	0.000000	.005778	.833943	.547143	.987075
6	2.624672	0.000000	.928855	.653166	.900813	0.000000	.005366	.837584	.547082	.993160
7	2.624672	0.000000	.958254	.647814	.882403	0.000000	.005173	.844239	.546910	1.004350
8	2.624672	0.000000	.975610	.631491	.821555	0.000000	.005546	.866081	.546923	1.040906
9	2.624672	0.000000	.985857	.607162	.731175	0.000000	.005909	.900595	.546807	1.099531
10	2.624672	0.000000	.991906	.586509	.656814	0.000000	.005523	.932361	.546838	1.154182
11	2.624672	0.000000	.995478	.572651	.608105	0.000000	.005237	.954839	.546789	1.193367
12	2.624672	0.000000	.997586	.564353	.579162	0.000000	.004707	.968880	.546790	1.218007
13	2.624672	0.000000	.998831	.559545	.562398	0.000000	.004549	.977261	.546822	1.232754
14	2.624672	0.000000	.999566	.556624	.552716	0.000000	.004211	.982185	.546708	1.241563
15	2.624672	0.000000	1.000000	.554879	.545847	0.000000	.004227	.985700	.546944	1.247571
16	2.624672	0.000000	1.000525	.553074	.541147	0.000000	.003922	.988099	.546492	1.252238
17	2.624672	0.000000	1.000580	.553428	.539264	0.000000	.004053	.989065	.547377	1.253142
18	2.624672	0.000000	1.000719	.551463	.537466	0.000000	.003870	.989990	.545943	1.256100
19	2.624672	0.000000	1.001069	.551969	.532960	0.000000	.003908	.992318	.547729	1.258592
20	2.624672	0.000000	1.001947	.546806	.521826	0.000000	.003480	.998155	.545797	1.270763
21	2.624672	0.000000	1.004152	.540917	.494867	0.000000	.002886	1.012679	.547775	1.294850
22	2.624672	0.000000	1.009692	.523255	.445062	0.000000	.000276	1.042992	.545751	1.351436
23	2.624672	0.000000	1.023607	.519674	.434915	0.000000	-.003500	1.053406	.547428	1.368685
24	2.624672	0.000000	1.058559	.516055	.461057	0.000000	-.014274	1.055731	.544815	1.375546
25	2.624672	0.000000	1.146356	.529164	.593098	0.000000	-.027910	1.033556	.546921	1.333207
26	2.624672	0.000000	1.366891	.546240	.762564	0.000000	-.048405	.987118	.539203	1.257234
27	2.624672	0.000000	1.920851	.552922	.845952	0.000000	-.035031	.962959	.532441	1.220514
28	2.624672	0.000000	3.312336	.510204	.791960	0.000000	-.028130	.980000	.500000	1.282710

J= 26 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.018373	0.000000	0.000000	.671254	1.034145	0.000000	0.000000	.786320	.527820	.922241
2	3.018373	0.000000	.409873	.668132	1.022774	0.000000	.006096	.790731	.528313	.929146
3	3.018373	0.000000	.651855	.658766	.988660	0.000000	.006416	.803964	.529624	.950046
4	3.018373	0.000000	.794717	.648446	.953913	0.000000	.005238	.817615	.530179	.972299
5	3.018373	0.000000	.879060	.642161	.931499	0.000000	.005103	.826279	.530604	.986436
6	3.018373	0.000000	.928855	.638924	.921058	0.000000	.004266	.830327	.530516	.993275
7	3.018373	0.000000	.958254	.632505	.898437	0.000000	.004643	.839281	.530850	1.008050
8	3.018373	0.000000	.975610	.613834	.836631	0.000000	.004559	.864403	.530600	1.050741
9	3.018373	0.000000	.985857	.591649	.761228	0.000000	.005256	.897369	.530927	1.106994
10	3.018373	0.000000	.991906	.574702	.706283	0.000000	.004389	.923210	.530571	1.152188
11	3.018373	0.000000	.995478	.564645	.671306	0.000000	.004748	.940437	.531013	1.182[illegible]
12	3.018373	0.000000	.997586	.557792	.650536	0.000000	.003875	.950964	.530440	1.201[illegible]
13	3.018373	0.000000	.998831	.554929	.638214	0.000000	.004393	.957311	.531240	1.21[illegible]
14	3.018373	0.000000	.999566	.551520	.630970	0.000000	.003633	.961082	.530[illegible]	1.21[illegible]
15	3.018373	0.000000	1.000000	.551802	.625774	0.000000	.004249	.963799	.531826	1.22569
16	3.018373	0.000000	1.000525	.548017	.622219	0.000000	.003506	.965670	.529204	1.228319
17	3.018373	0.000000	1.000580	.552104	.620794	0.000000	.004162	.966421	.533560	1.225626

18	3.018373	0.000000	1.000719	.544633	.619432	0.000000	.003494	.967142	.526737	1.233243
19	3.018373	0.000000	1.001069	.552430	.615991	0.000000	.004093	.968964	.535285	1.228560
20	3.018373	0.000000	1.001947	.540380	.607481	0.000000	.003300	.973498	.526058	1.245247
21	3.018373	0.000000	1.004152	.543587	.585940	0.000000	.003716	.985213	.535549	1.257253
22	3.018373	0.000000	1.009692	.519602	.538843	0.000000	.001794	1.012296	.525991	1.315344
23	3.018373	0.000000	1.023607	.518240	.510456	0.000000	.000300	1.033107	.535397	1.343795
24	3.018373	0.000000	1.058559	.506432	.531123	0.000000	-.009126	1.038327	.525841	1.363094
25	3.018373	0.000000	1.146356	.523386	.649244	0.000000	-.018508	1.020807	.534276	1.322558
26	3.018373	0.000000	1.366891	.536781	.793635	0.000000	-.033380	.977042	.524458	1.253125
27	3.018373	0.000000	1.920851	.546333	.857006	0.000000	-.020812	.959418	.524162	1.221870
28	3.018373	0.000000	3.312336	.510204	.791960	0.000000	-.020278	.980000	.500000	1.282710

J= 27 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.412073	0.000000	0.000000	.659119	1.046790	0.000000	0.000000	.780946	.514736	.922647
2	3.412073	0.000000	.409873	.656376	1.035768	0.000000	.003499	.785328	.515470	.929372
3	3.412073	0.000000	.651855	.648148	1.002703	0.000000	.004195	.798472	.517528	.949708
4	3.412073	0.000000	.794717	.637884	.969095	0.000000	.003200	.811697	.517768	.971621
5	3.412073	0.000000	.879060	.631912	.947102	0.000000	.003640	.820378	.518407	.985715
6	3.412073	0.000000	.928855	.628710	.936867	0.000000	.002748	.824178	.518169	.992295
7	3.412073	0.000000	.958254	.621766	.912473	0.000000	.003606	.834107	.518619	1.008720
8	3.412073	0.000000	.975610	.601811	.850931	0.000000	.003409	.861149	.518250	1.055102
9	3.412073	0.000000	.985857	.580709	.784304	0.000000	.004206	.893167	.518669	1.110067
10	3.412073	0.000000	.991906	.565069	.738635	0.000000	.003314	.917088	.518217	1.152313
11	3.412073	0.000000	.995478	.555912	.710047	0.000000	.003914	.933158	.518754	1.180192
12	3.412073	0.000000	.997566	.549331	.693243	0.000000	.003007	.943112	.518081	1.198476
13	3.412073	0.000000	.998831	.546772	.683335	0.000000	.003705	.949192	.518992	1.208457
14	3.412073	0.000000	.999566	.543306	.677541	0.000000	.002861	.952831	.517679	1.216180
15	3.412073	0.000000	1.000000	.543822	.673403	0.000000	.003617	.955466	.519603	1.219081
16	3.412073	0.000000	1.000525	.539857	.670580	0.000000	.002783	.957287	.516798	1.224984
17	3.412073	0.000000	1.000580	.544255	.669453	0.000000	.003560	.958019	.521406	1.221950
18	3.412073	0.000000	1.000719	.536349	.668375	0.000000	.002777	.958722	.514210	1.230024
19	3.412073	0.000000	1.001069	.544742	.665660	0.000000	.003515	.960504	.523226	1.224680
20	3.412073	0.000000	1.001947	.532142	.658974	0.000000	.002654	.964961	.513496	1.241935
21	3.412073	0.000000	1.004152	.536031	.642414	0.000000	.003280	.976615	.523496	1.253277
22	3.412073	0.000000	1.009692	.511259	.608510	0.000000	.001615	1.004262	.513438	1.313381
23	3.412073	0.000000	1.023607	.515321	.604468	0.000000	.000808	1.015506	.523312	1.323888
24	3.412073	0.000000	1.058559	.503716	.619960	0.000000	-.007541	1.017069	.512314	1.338062
25	3.412073	0.000000	1.146356	.517760	.687047	0.000000	-.016250	1.008398	.522108	1.312142
26	3.412073	0.000000	1.366891	.529064	.812731	0.000000	-.024814	.970305	.513353	1.251715
27	3.412073	0.000000	1.920851	.541018	.865922	0.000000	-.010339	.956590	.517533	1.223042
28	3.412073	0.000000	3.312336	.510204	.791960	0.000000	-.014072	.980000	.500000	1.282710

J= 28 K= 1

L	X	Y	Z	R/RREF	U/AREF	V/AREF	W/AREF	T/TREF	P/PREF	ENT
1	3.805774	0.000000	0.000000	.653799	1.051796	0.000000	0.000000	.778780	.509166	.923076
2	3.805774	0.000000	.409873	.650980	1.041383	0.000000	.002023	.782968	.509696	.929645
3	3.805774	0.000000	.651855	.642522	1.010142	0.000000	.002946	.795530	.511146	.949514
4	3.805774	0.000000	.794717	.632373	.977385	0.000000	.002131	.808451	.511242	.971101
5	3.805774	0.000000	.879060	.626293	.955722	0.000000	.002524	.817058	.511718	.985240
6	3.805774	0.000000	.928855	.622386	.943242	0.000000	.001875	.821947	.511568	.993618
7	3.805774	0.000000	.958254	.612770	.913438	0.000000	.002930	.835357	.511882	1.016140
8	3.805774	0.000000	.975610	.592410	.854519	0.000000	.003281	.863640	.511629	1.064839
9	3.805774	0.000000	.985857	.573262	.798417	0.000000	.003794	.892949	.511893	1.115541
10	3.805774	0.000000	.991906	.559759	.761374	0.000000	.003261	.913940	.511587	1.152703
11	3.805774	0.000000	.995478	.552063	.739152	0.000000	.003512	.927351	.511956	1.176112
12	3.805774	0.000000	.997586	.546746	.726277	0.000000	.002961	.935463	.511460	1.191002
13	3.805774	0.000000	.998831	.544677	.718807	0.000000	.003292	.940302	.512160	1.198979
14	3.805774	0.000000	.999566	.541902	.714459	0.000000	.002811	.943167	.511104	1.205092
15	3.805774	0.000000	1.000000	.542410	.711372	0.000000	.003198	.945222	.512698	1.207265
16	3.805774	0.000000	1.000525	.539089	.709270	0.000000	.002730	.946634	.510320	1.212043
17	3.805774	0.000000	1.000580	.542962	.708431	0.000000	.003141	.947200	.514293	1.209300
18	3.805774	0.000000	1.000719	.536063	.707631	0.000000	.002719	.947741	.508050	1.216196
19	3.805774	0.000000	1.001069	.543538	.705617	0.000000	.003094	.949110	.515877	1.211224
20	3.805774	0.000000	1.001947	.532729	.700673	0.000000	.002597	.952508	.507429	1.225366
21	3.805774	0.000000	1.004152	.536988	.688559	0.000000	.002815	.961107	.516103	1.232497
22	3.805774	0.000000	1.009692	.517221	.662798	0.000000	.001564	.980956	.507371	1.276965

23	3.805774	0.000000	1.023607	.514404	.650962	0.000000	.000274	1.003261	.516081	1.308857
24	3.805774	0.000000	1.058559	.504038	.663874	0.000000	-.004721	1.006137	.507131	1.323341
25	3.805774	0.000000	1.146356	.515164	.717327	0.000000	-.011183	.998806	.514548	1.302275
26	3.805774	0.000000	1.366891	.524285	.825519	0.000000	-.021784	.965556	.506227	1.250117
27	3.805774	0.000000	1.920851	.537282	.870741	0.000000	-.005897	.955113	.513165	1.224543
28	3.805774	0.000000	3.312336	.510204	.791960	0.000000	-.010259	.980000	.500000	1.282710

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16. Abstract

Complete FORTRAN listings and running instructions are given for a set of computer programs that perform an implicit numerical solution to the unsteady Navier-Stokes equations to predict the flow characteristics and performance of nonaxisymmetric nozzles. The set includes the NOZL3D program, which performs the flow computations; the NOZLIC program, which sets up the flowfield initial conditions for general nozzle configurations, and also generates the computational grid for simple two-dimensional and axisymmetric configurations; and the RGRIDD program, which generates the computational grid for complicated three-dimensional configurations. The programs are designed specifically for the NASA-Langley CYBER 175 computer, and employ auxiliary disk files for primary data storage. Input instructions and computed results are given for four test cases that include two-dimensional, three-dimensional, and axisymmetric configurations.

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