

# Sea Grant College Program

MIT-T-86-003 C2

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**02139**

## ABSTRACT

The Seakeeping Program CAT-5 reported in [1,2,3] developed for catamarans has been modified to allow seakeeping computations for swath ships. Comparisons of the results of the modified program for catamaran and swath ships with published experimental and other theoretical results are included.

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## REFERENCES

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## 1. DESCRIPTION OF PROGRAM CAT-5 MODIFICATIONS

Computations of hydrodynamic characteristics of twin hull ship sections performed in subroutine CAT2DS of program CAT-5 reported in [1,2,3] are based on the theory developed in [4]. It was found that the symbolic manipulations used in Appendices A and B of [4] to compute the integrals  $L_i$  and  $K_i$  ( $i = 1$  to  $4$ ) as implemented in CAT2DS did not generally give reliable results for swath and fully submerged sections. As a result the values of the hydrodynamic coefficients for such sections did not compare favorably with published experimental and other theoretical results. It was then decided to use a numerical integration method to perform these integrals directly without any symbolic manipulations. The numerical integration method used, although approximate, is very accurate and consistent with the numerical discretization procedures leading to Appendices A and B of [4]. In the sequel, the expressions used for the numerical computation of the above integrals are given.

### 1.1 Integrals $L_1$ and $K_1$

$$\text{Integral } L_1 = \text{Re}_i \left\{ \vec{n} \cdot \nabla_{c_j}^f \log(z-\zeta) ds \Big|_{z=z_i} \right\}$$

$$\text{Let } \vec{r}_{ij} = (x_i - x_j)\vec{i} + (y_i - y_j)\vec{j}$$

where  $(x_i, y_i), (x_j, y_j)$  are the coordinates of the middle points of segments  $c_i$  and  $c_j$ , respectively, and  $\vec{i}, \vec{j}$  the unit vectors in the  $x, y$  directions (horizontal and vertical (positive up)). Let  $l_j$  the length of segment  $c_j$ . For  $i \neq j$ , we use the approximation:

$$L_1 \approx \ell_j (\vec{n}_i \cdot \nabla_i) \log |\vec{r}_{ij}|$$

We have, however,

$$\nabla_i \log |\vec{r}_{ij}| = \vec{r}_{ij} / |\vec{r}_{ij}|^2$$

and therefore

$$L_1 \approx \ell_j (\vec{n}_i \cdot \vec{r}_{ij}) / |\vec{r}_{ij}|^2, \quad i \neq j$$

For  $i = j$ , we have  $L_1 = \pi$ , see [5].

$$\text{Integral } K_1 = \text{Re}_i \int_{C_j} \log(z_i - \zeta) ds$$

For  $i \neq j$ , we use the approximation

$$K_1 \approx \ell_j \log |\vec{r}_{ij}|$$

For  $i = j$  we obtain

$$K_1 = \ell_j [\log(\ell_j/2) - 1]$$

1.2 Integrals  $L_2$  and  $K_2$ 

$$\text{Integral } L_2 = \text{Re}_i \left\{ \vec{n} \cdot \nabla_{\vec{c}_j} \int \log(z - \bar{\zeta}) ds \Big|_{z=z_i} \right\}$$

$$\text{Let } \vec{r}_{ij} = (x_i - x_j)\vec{i} + (y_i + y_j)\vec{j}$$

$$\text{Then } L_2 \approx \ell_j (\vec{n}_i \cdot \vec{r}_{ij}) / |\vec{r}_{ij}|^2$$

$$\text{Integral } K_2 = \text{Re}_{i\vec{c}_j} \int \log(z_i - \bar{\zeta}) ds$$

$$\text{Then } K_2 \approx \ell_j \log |\vec{r}_{ij}|$$

1.3 Integrals  $L_3$  and  $K_3$ 

$$\text{Integral } L_3 = \text{Re}_i \left\{ \vec{n} \cdot \nabla_{\vec{c}_j} \int \log(z + \bar{\zeta}) ds \Big|_{z=z_i} \right\}$$

$$\text{Let } \vec{r}_{ij} = (x_i + x_j)\vec{i} + (y_i - y_j)\vec{j}$$

$$\text{Then } L_3 \approx \ell_j (\vec{n}_i \cdot \vec{r}_{ij}) / |\vec{r}_{ij}|^2$$

$$\text{Integral } K_3 = \text{Re}_{i\vec{c}_j} \int \log(z_i + \bar{\zeta}) ds$$

$$\text{Then } K_3 \approx \ell_j \log |\vec{r}_{ij}|$$

1.4 Integrals  $L_4$  and  $K_4$ 

$$\text{Integral } L_4 = \text{Re}_i \left\{ \vec{n} \cdot \nabla_{\vec{c}_j} \int \log(z + \zeta) ds \Big|_{z=z_i} \right\}$$

$$\text{Let } \vec{r}_{ij} = (x_i + x_j)\vec{i} + (y_i + y_j)\vec{j}$$

$$L_4 \approx \ell_j (\vec{n}_i \cdot \vec{r}_{ij}) / |\vec{r}_{ij}|^2$$

$$\text{Integral } K_4 = \text{Re}_{i\vec{c}_j} \int \log(z_i + \zeta) ds$$

$$\text{Then } K_4 \approx \ell_j \log |\vec{r}_{ij}|$$

In addition to the above modifications performed in subroutine CAT2DS, we also included an explicit evaluation and printout of the sectional added mass and damping coefficients in heave, sway and roll. To allow automatic computation of non-dimensional values of these coefficients, we needed to use the cross-sectional area of each station. To do this we input these cross-sectional areas in the main program just below NSTA, NROMS, and so forth with FORMAT (8E10.4); i.e., as Data Set #3.

## 2. COMPARISONS OF RESULTS FOR HYDRODYNAMIC COEFFICIENTS AND MOTIONS WITH EXPERIMENTS AND OTHER THEORETICAL RESULTS

To show that the numerical integration explained in Section 1 provides good estimates of the actual integrals, we include Figures 1 and 2 for the added mass and damping coefficients  $a_{33}^*$  and  $b_{33}^*$  of the twin semi-circular sections also shown in these figures. The symbols used in these figures are explained below:

- $\delta$   $\omega^2 a/g$  where  $\omega$  is the circular frequency of oscillation and  $g$  the acceleration of gravity.
- $b$  Distance between the plane of symmetries of the overall section and the single hull
- $a$  Radius of the single hull
- $a_{33}^*$   $a_{33}/\rho \cdot A$ , where  $a_{33}$  is the added mass per unit length in heave,  $\rho$  the fluid density and  $A$  the overall cross-sectional area.
- $b_{33}^*$   $b_{33}/\rho A \omega$ , where  $b_{33}$  is damping force per unit length.



The solid line denotes the results of [2], ● the experimental results of [6], ○ results computed by Oksusu's method [6]. The symbols + and □ denote the results of our modified program with 9 and 17 uniform discretization points per single hull. The agreement is very good, indicating the accuracy of the numerical procedure for the evaluation of the above integrals and convergence for nine discretization points.

Figures 3 and 4 show comparisons of the results of the modified program for the added mass and damping coefficients in heave ( $\bar{a}_{33}$  and  $\bar{b}_{33}$ ) and sway ( $\bar{a}_{22}$  and  $\bar{b}_{22}$ ) respectively for a twin submerged circular cross-section also shown in the same figures. The solid and dashed lines denote theoretical results based on an accurate and an approximate theory described in [7]. The symbols + and □ depict our results and have the same meaning as before. The non-dimensionalization method for the sway results is the same as for heave. Again, the agreement is very good.

Figures 5 and 6 show comparisons of our results for the added mass and damping coefficients in heave for the SWATH cross-section shown in Figure 6. The solid and dashed lines denote theoretical results based on an accurate and an approximate theory described in [7]. The symbol Δ denotes experiments also described in [7]. The symbols + and □ depict our results and have the same meaning as before. Again the agreement is good, although some discrepancy with the experimental and approximate theoretical results of [7] for the damping exists for high frequencies.

Figures 7 and 8 show results similar to Figures 5 and 6 for sway rather than heave and for the cross-section also shown in Figure 8. The line - . - represents an approximate theory [7] with a correction factor  $c_2=1$  also discussed in [7]. The agreement between our results and the accurate theory [7] is very good. The correlation of the added mass coefficient with experiments is very good. Some discrepancies are, however, apparent for the damping coefficient.

Figures 9 and 10 show results similar to Figures 7 and 8 for roll rather than sway and for the cross-section of Figure 8, also shown in Figure 10. The comparisons of the results for the added inertia from all theoretical methods and experiments are reasonably good, although the comparison for the damping coefficient is rather poor. The non-dimensional coefficients used in Figures 9 and 10 are

$$\bar{a}_{44} = A_{44}/\rho b^2 S_A \text{ and } \bar{b}_{44} = B_{44}/\rho b^2 \omega S_A$$

where  $S_A$  is the cross-sectional area of one hull and  $A_{44}$  and  $B_{44}$  are the added inertia and damping per unit length. The non-dimensional values printed by the program are one-half the above values because the program uses  $A=2S_A$  instead of  $S_A$  in the above formulas for  $\bar{a}_{44}$  and  $\bar{b}_{44}$ .

Next we present overall results of the modified program for the SWATH IV ship described in [8], Model 5287, for the bare hull at 28 ft. draft and zero speed and for the same hull with fins at 32 ft. draft and at zero or twenty knot speeds. The overall characteristics of the present SWATH ship are shown in Table 1, adapted from [8]. Data file SWARTH1R DATA A shown in Section 4

of this report is a complete output of the program for the case of head regular waves incident upon the bare hull at zero speed. The input data file necessary for the execution of our program is also listed in Section 4 as SWATH1 DATA A. Figures 11 and 12 show comparisons of the above results for the bare hull for heave and pitch response amplitude operator and corresponding phases with the experiments (o) presented in [8]. The symbols + and  $\Delta$  denote our heave and pitch results respectively,  $\omega_e$  is the encounter frequency (which in this case is the absolute frequency) and  $\omega_z$  the heave natural frequency,  $\omega_z = 0.613$  rad/s, in this case. The correlation between theoretical and experimental results is good as far as the prediction of resonance frequencies. However, the theory overpredicts heave and pitch R.A.O.'s near the resonance frequencies. This can be explained because in SWATH ships radiation damping predicted by the theory is not the major portion of the overall damping, which now includes significant real fluid contributions (separation and viscous effects). The inclusion of such effects in future versions of our prediction programs is recommended.

Figures 13 and 14 show the response amplitude operator and phase of heave and pitch in head regular waves for the SWATH IV ship of Table 1 at a draft of 32 ft. and with the large fins described in [8] and Table 2 at zero and twenty knot speeds. For the case of zero speed, the theory again overpredicts the response near the resonance frequencies for the reasons given above. For the 20 knot case, where the effects of the fins are pronounced, heave and pitch decrease substantially with respect to the zero speed case [9]. The output for this case is shown in Section 4 as SWATH3R

DATA A and the corresponding input as SWATH3 DATA A. The correlation between theory and experiment is improved in this case but is not entirely satisfactory. It is recommended that the real fluid effects on the hull be included in the prediction method because their importance is stronger for SWATH hulls compared to catamarans and monohulls. A method to incorporate such effects in the prediction process can be found in [9].

TABLE 1

SWATH IV Ship Particulars - Bare Hull, Adapted from [8]

Particular	Unit of Measure	28 ft Draft	32 ft Draft
Length (LOA)	Feet	287.6	287.6
Length (LWL)	Feet	226.7	226.7
Beam each Hull	Feet	18	18
Midship Maximum Breadth	Feet	93	93
Displacement	Long Tons	3960	4270
Longitudinal Center of Gravity (Aft of FP)	Feet	110.5	110.7
Vertical Center of Gravity ( $\overline{KG}$ )	Feet	31.23	30.04
Longitudinal Radius of Gyration	-	0.233 LOA	0.226 LOA
Distance Between Centerlines at Station 10	Feet	75	75
Transverse Metacentric Height ( $\overline{GM}_T$ )	Feet	7.99	8.19
Bridging Structure Clearance	Feet	19	15
Natural Heave Period	Seconds	10.25	10.39
Natural Pitch Period	Seconds	16.21	16.21
Natural Roll Period	Seconds	17.95	18.20

TABLE 2

## Large Fin Characteristics [8]

Span	s = 16.36 ft.
Cord	c = 13.6 ft.
Depth	d = -23 ft.
X	= -115.02 ft.

For evaluation of lift and drag coefficients  $C_L$  and  $C_D$  for the hydrofoil, see [3]. In the present case we used  $C_L = 3$  and  $C_D = 4$ .

We also assumed that the mass of the hydrofoil is zero because it is negligible with respect to the mass of the ship.

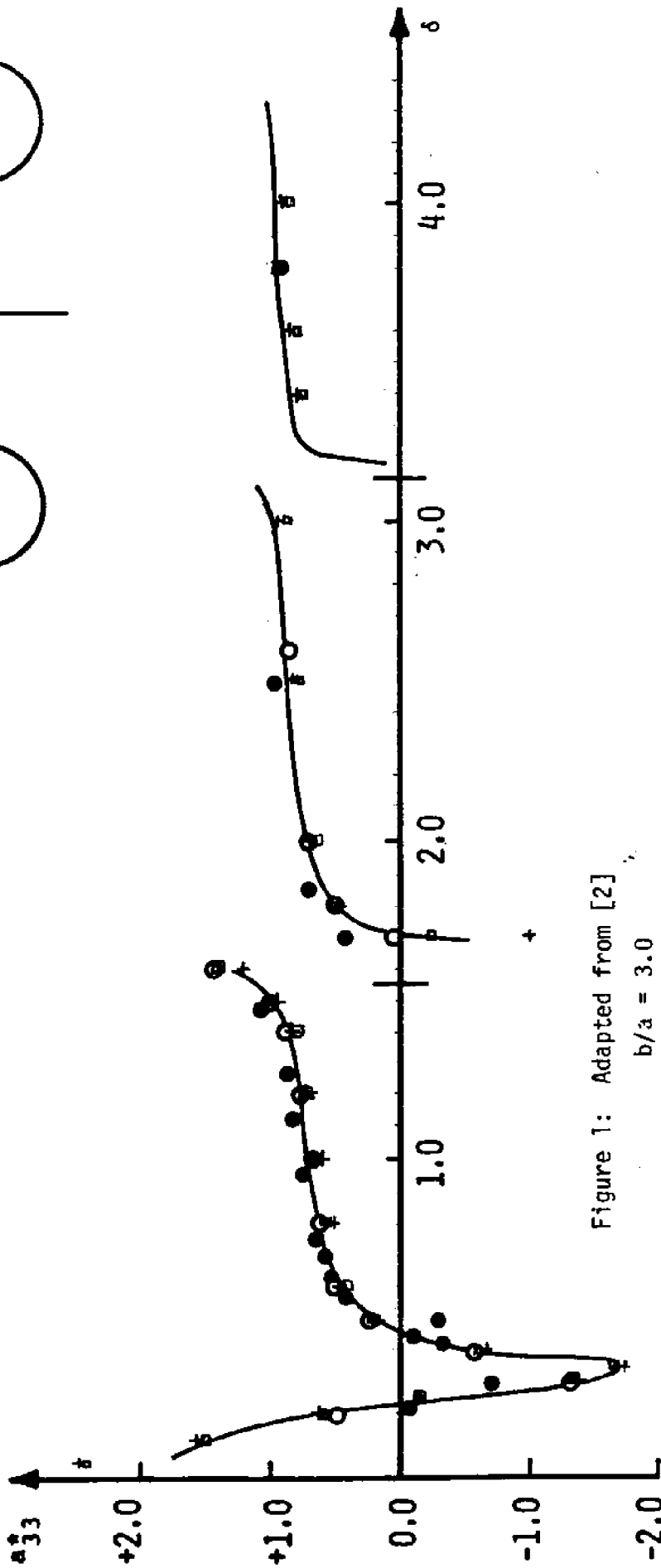
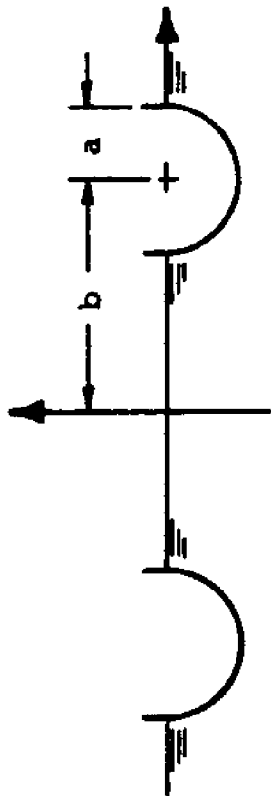


Figure 1: Adapted from [2]  
 $b/a = 3.0$

- EXPERIMENT [6]
- OHKUSU METHOD [6]
- REFERENCE [2]
- + PRESENT THEORY [9 POINTS]
- PRESENT THEORY [17 POINTS]

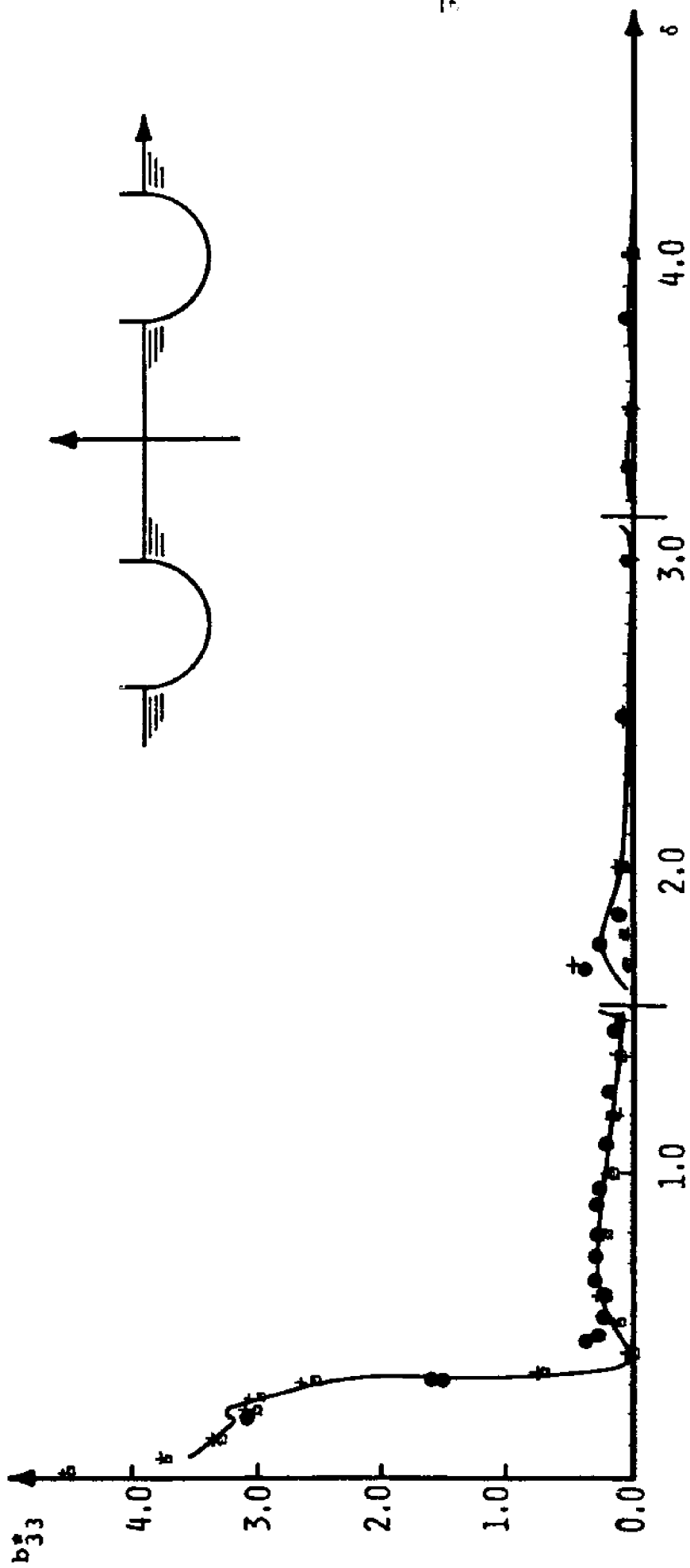


Figure 2: Adapted from [2]

$b/a = 3.0$

- EXPERIMENT [4]
- REFERENCE [2]
- + PRESENT THEORY [9 POINTS]
- PRESENT THEORY [17 POINTS]



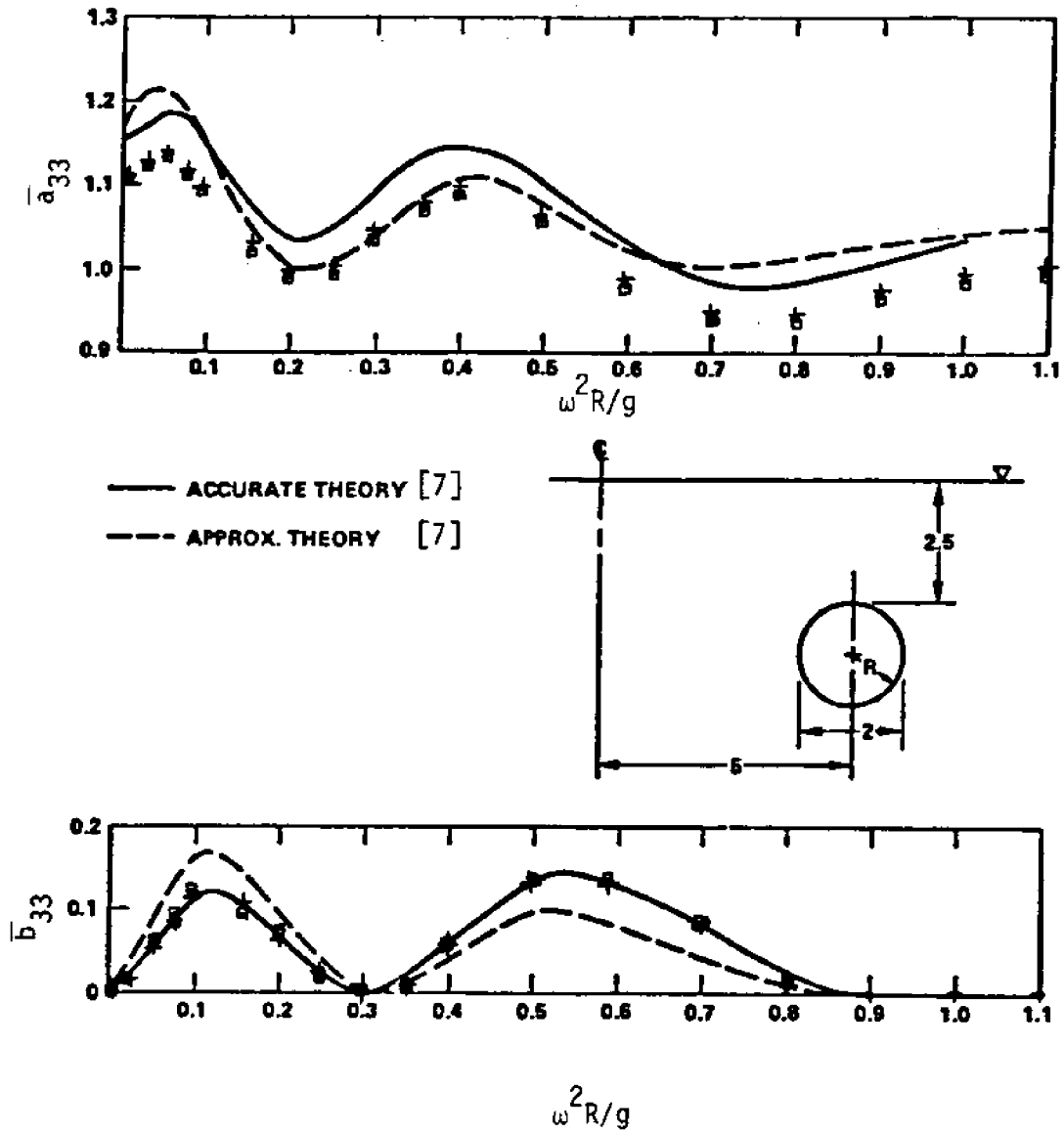


Figure 3: Heave Added-Mass and Damping Coefficients of Submerged Twin Circles, adapted from [7]

+ PRESENT THEORY [9 POINTS]  
 □ PRESENT THEORY [17 POINTS]

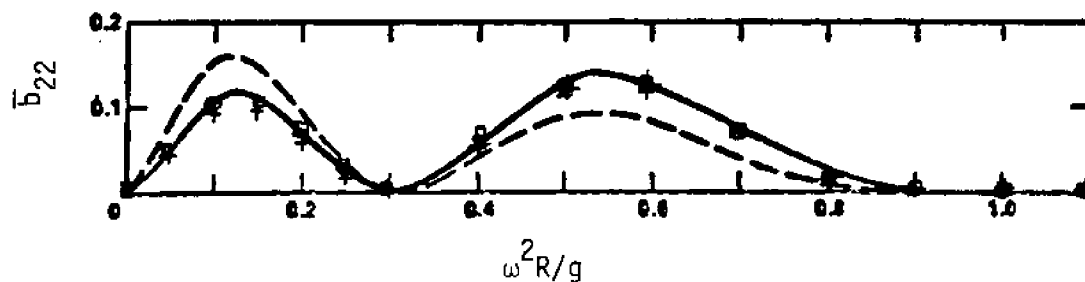
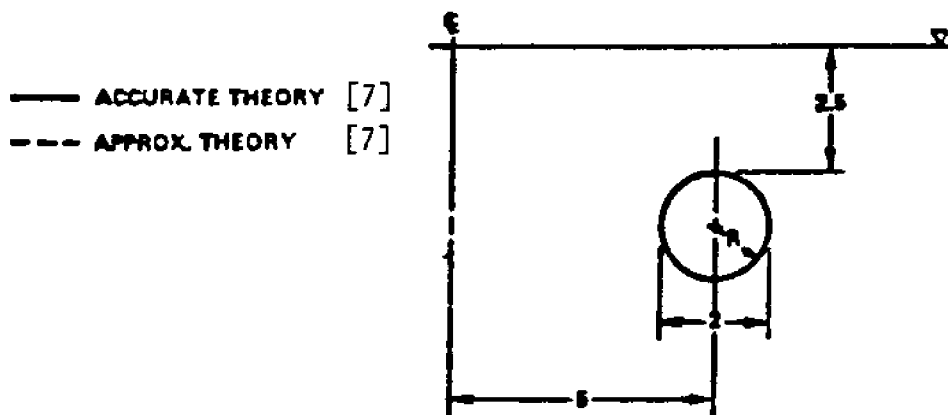
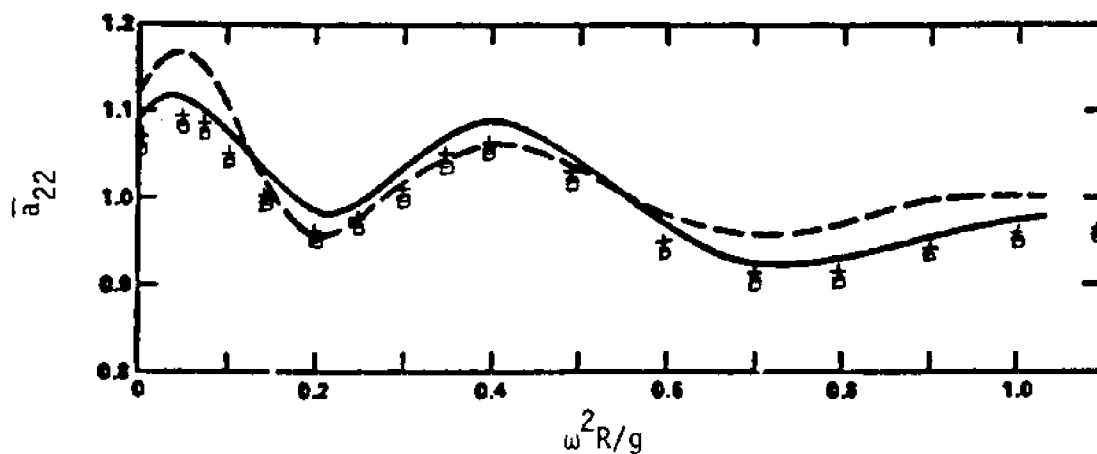


Figure 4: Sway Added-Mass and Damping Coefficients of Submerged Twin Circles, adapted from [7]

+ PRESENT THEORY [9 POINTS]  
 □ PRESENT THEORY [17 POINTS]

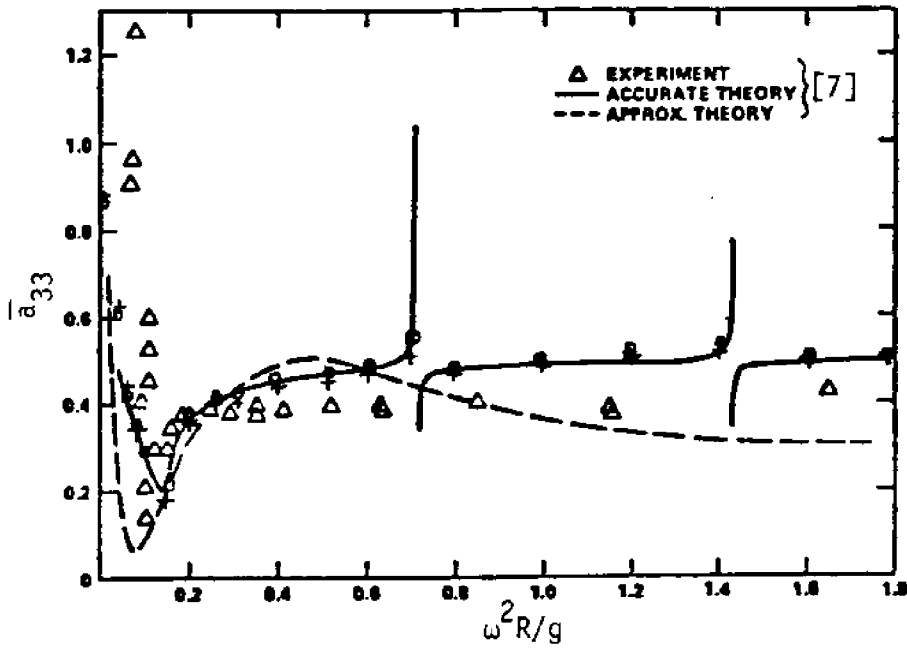


Figure 5: Heave Added-Mass Coefficient of a SWATH Section, adapted from [7]

+ PRESENT THEORY [9 POINTS]  
 □ PRESENT THEORY [15 POINTS]

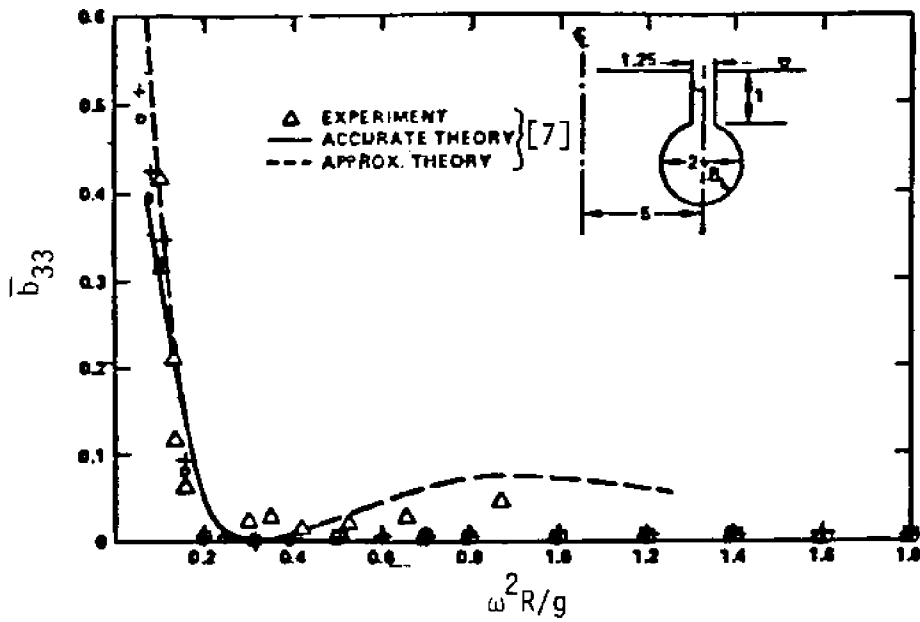


Figure 6: Heave Damping Coefficient of a SWATH Section, adapted from [7]

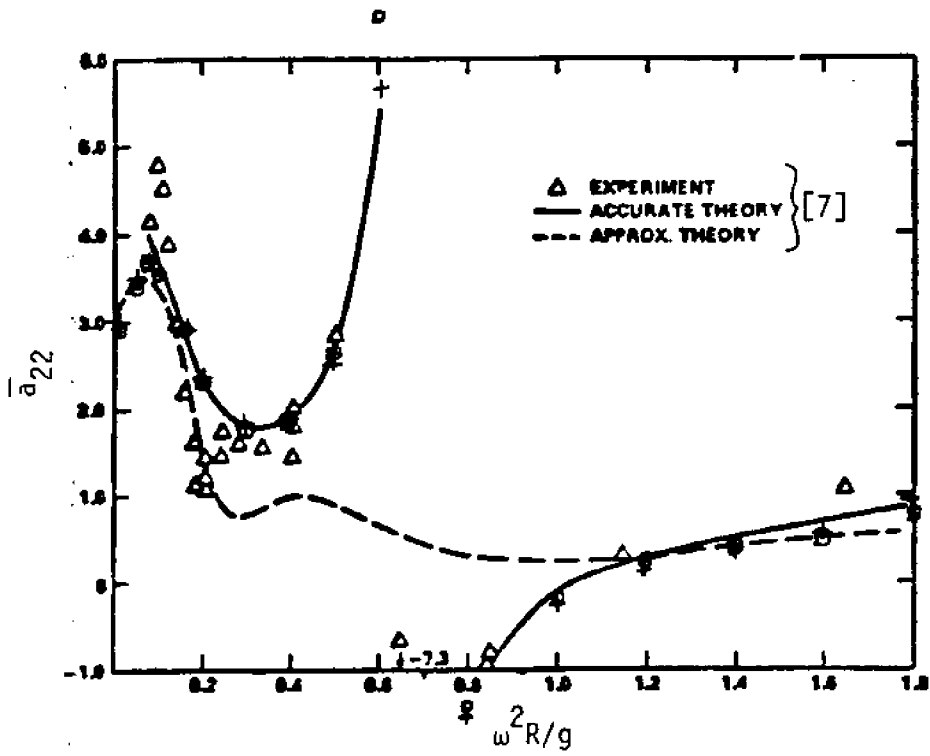


Figure 7: Sway Added-Mass Coefficient of a SWATH Section, adapted from [7]

+ PRESENT THEORY [9 POINTS]  
 □ PRESENT THEORY [15 POINTS]

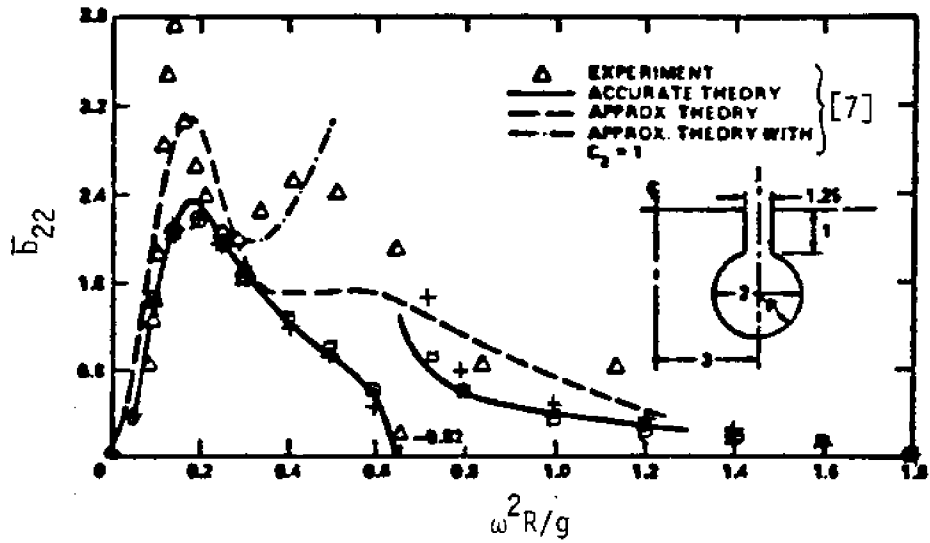


Figure 8: Sway Damping Coefficient of a SWATH Section, adapted from [7]

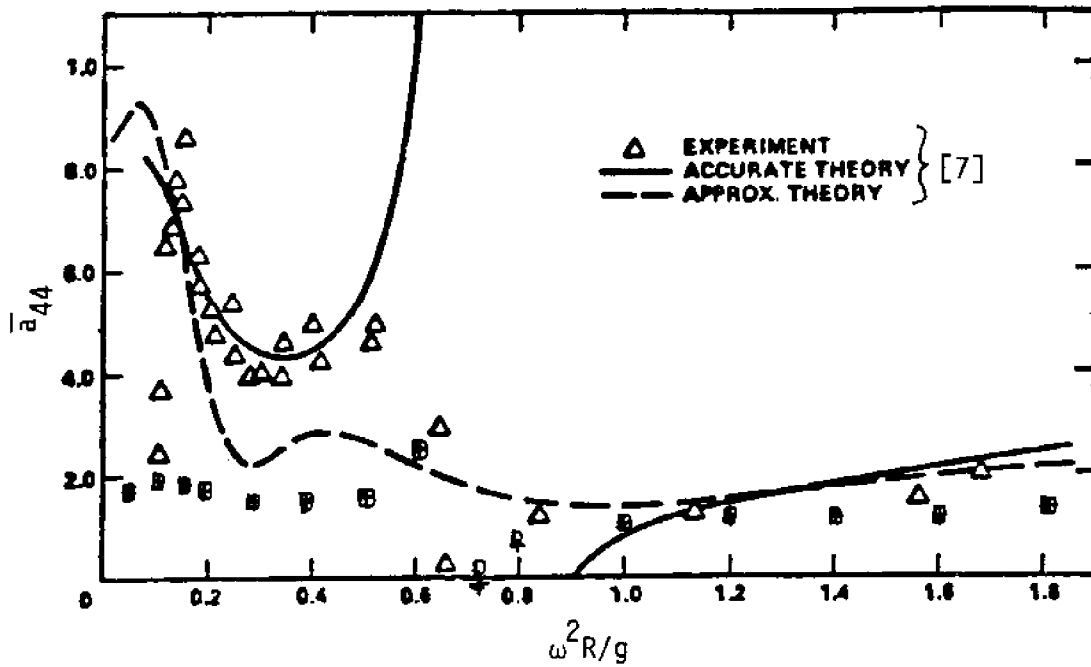


Figure 9: Roll Added-Inertia Coefficient of a SWATH Section, adapted from [7]

+ PRESENT THEORY [9 POINTS]  
 □ PRESENT THEORY [15 POINTS]

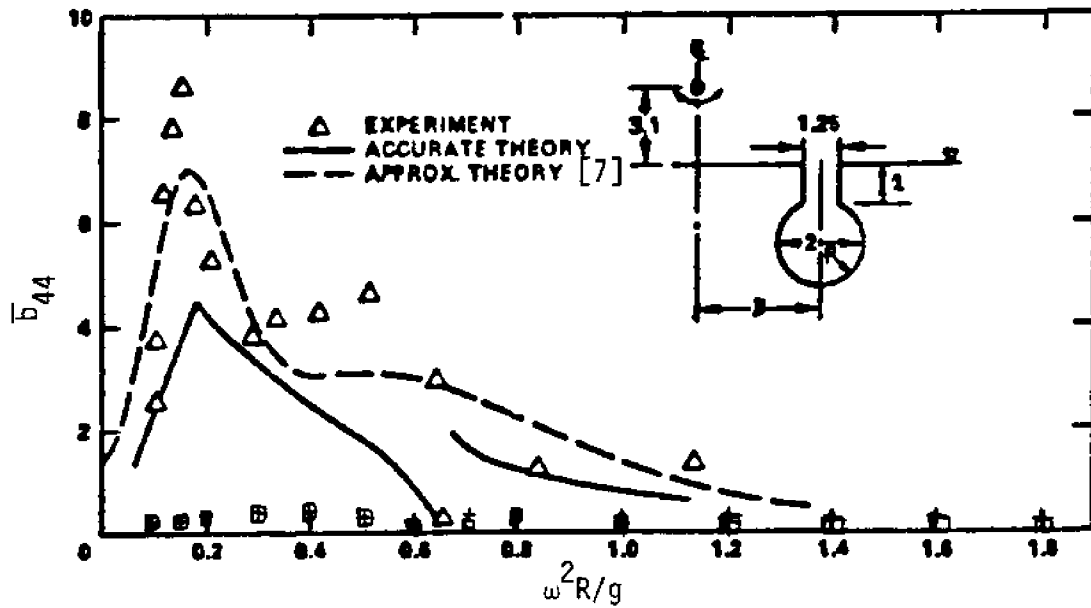


Figure 10: Roll Damping Coefficient of a SWATH Section, adapted from [7]

SWATH IV  
Motions in Regular Head Seas  
Bare Hull 0 Knots

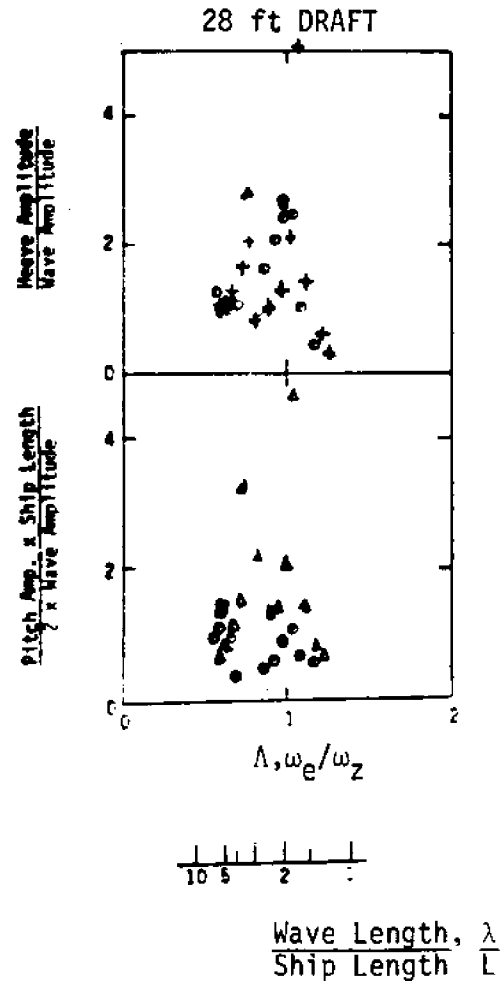


Figure 11: Motions in Regular Head Seas - Bare Hull, 0 Knots, adapted from [8]

- + HEAVE, PRESENT THEORY
- Δ PITCH, PRESENT THEORY
- o EXPERIMENTS [8]

## SWATH IV

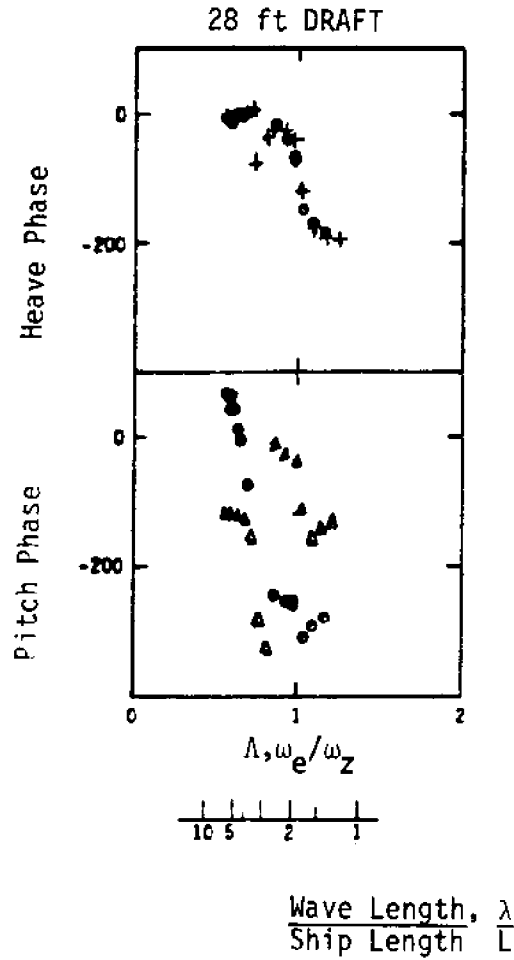
Phases in Regular Head Seas  
Bare Hull 0 Knots

Figure 12: Phases in Regular Head Seas - Bare Hull, 0 Knots, adapted from [8]

+ HEAVE PHASE, PRESENT THEORY  
 $\Delta$  PITCH PHASE, PRESENT THEORY  
 o EXPERIMENTS [8]

SMATH IV  
 Heave Motions and Phases in Regular Head Seas  
 32 ft Draft

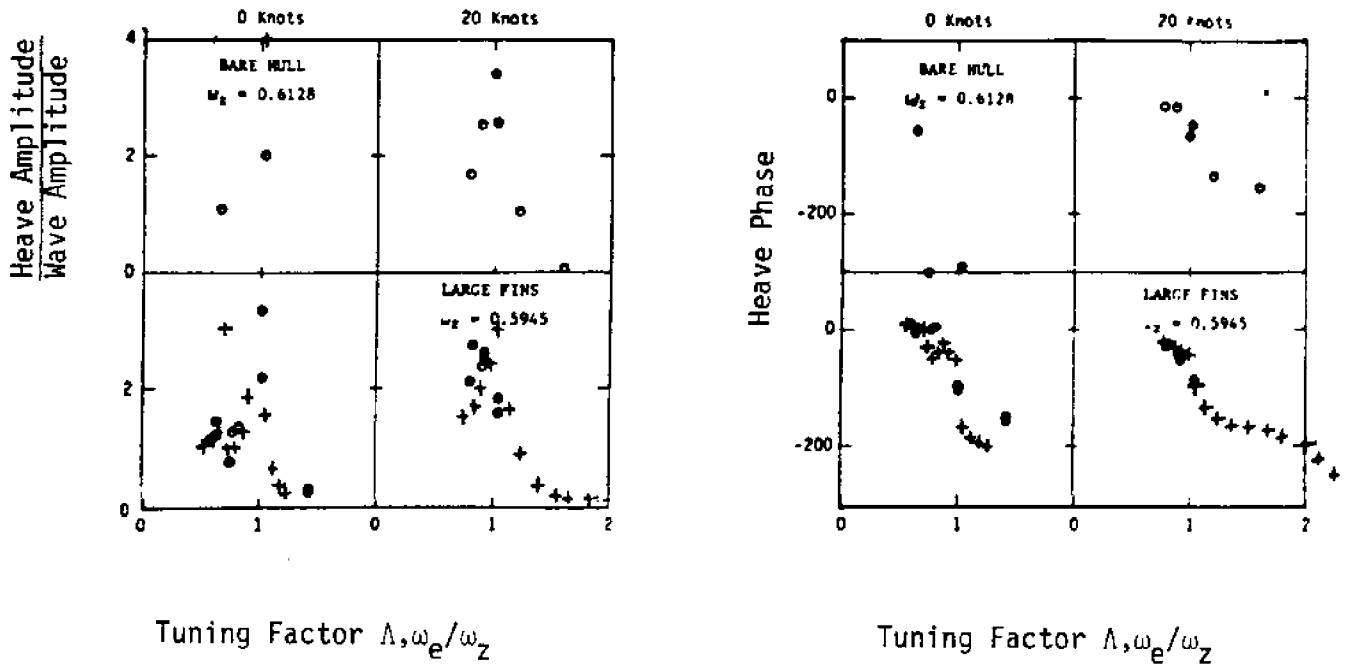


Figure 13: Heave Motions and Phases in Regular Head Seas, 32 ft Draft, adapted from [8]

+ HEAVE, PRESENT THEORY  
 o EXPERIMENTS [8]



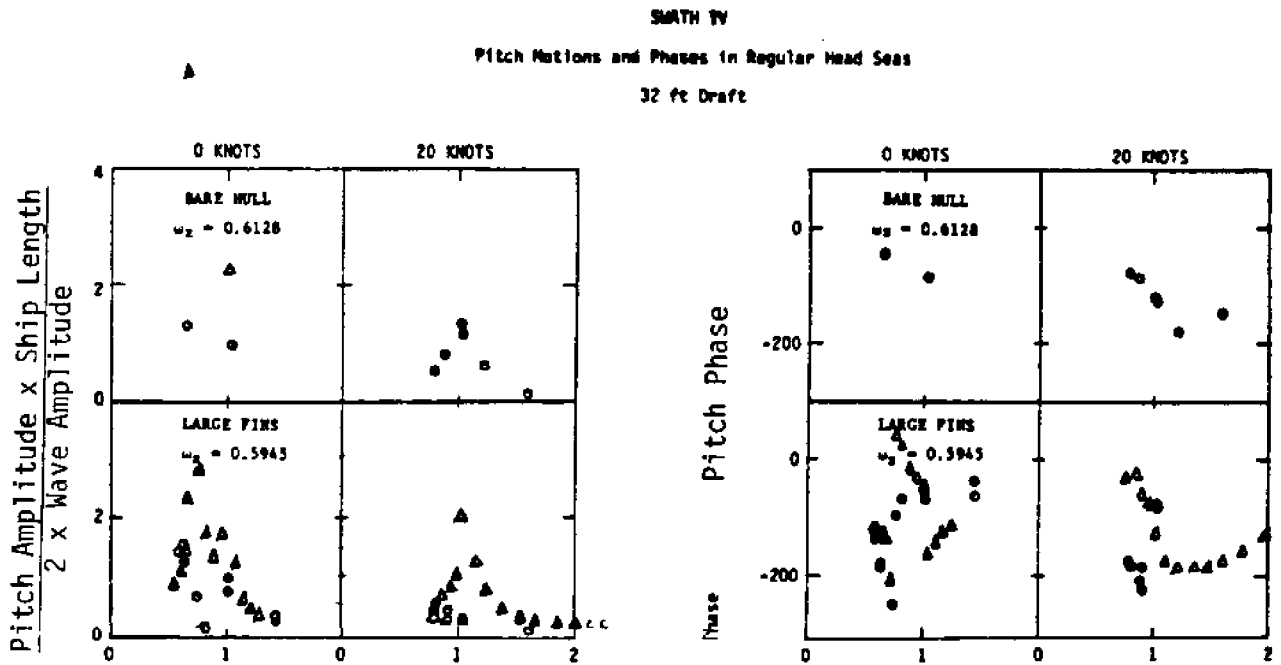


Figure 14: Pitch Motions and Phases in Regular Head Seas, 32 ft Draft, adapted from [8]

Δ, PITCH, PRESENT THEORY  
o, PITCH, EXPERIMENTS [8]

3. MODIFIED PROGRAM LISTING

SWATHPO FORTRAN A

```

C      MAIN PROGRAM
REAL*8 TITLE(40)
COMPLEX CMPLX,CEXP,F2,F3,F4,H2,H3,H4,ETA(6),F(6),VLOAD(6)
C      ,HF3,ZUNIT,QDD,QL2,QL3,QL4,QFH2,QFH3,QFH4
COMMON/CMFRDB/QDD(6),QL2,QL3,QL4,QFH2,QFH3,QFH4,ZUNIT,XL(31)
C      ,YL(31),ICAT,IXYN
COMMON/CATMN/NPP(27),XPT(31,27),YPT(31,27),XI(27),GRAV,RHO,IE
C      ,MD,ML
COMMON /ABFW/ A22(27),A33(27),A44(27),A24(27),B22(27),B33(27)
C      ,B44(27),B24(27),F2(27),F3(27),F4(27),H2(27),H3(27),H4(27)
C      ,A23(27),A43(27),B23(27),B43(27),A32(27),A34(27),A42(27),B32(27)
C      ,B34(27),B42(27)
COMMON/DYOD/V02(27),V03(27),V04(27),V05(27),V06(27)
C      ,BET,XCGP,YCGP,ZCGP,YBP,C33,C35,GMASS,WN ,ZETAA,ZDECK
COMMON/SCREST/RSE2(10,10),RSE3(10,10),RSE4(10,10),RSE5(10,10),
CRSE6(10,10),RSV2(10,10),RSV3(10,10),RSV4(10,10),RSV5(10,10),
CRSV6(10,10),ALPHA(10),ZETA13(10),OMP(10)
COMMON/SPTM/OMEGAM(30),OMEGA(30) ,OMEGAE(30),ESPC1(30),
CESPC2(30),ESPC3(30),ESPC4(30),ESPC5(30),ESPC6(30),VSPC1(30),
CVSPC2(30),VSPC3(30),VSPC4(30),VSPC5(30),VSPC6(30)
DIMENSION YM(27),DX(26),BETA(15),LOSH(15) ,GMA(6,6),A(6,6),B(6,6)
C      ,C(6,6),DYP(27),OMEGAN(30)
COM
COMMON/ARE/AREAC(50)
COM
DATA OMEGAN/.20,.25,.30,.35,.40,.45,.50,.55,.60,.65,.70,.75,.80,
C      .85,.90,.95,1.00,1.05,1.10,1.15,1.20,1.30,1.40,1.50,1.60,
C      1.70,1.80,2.00,2.50,3.00/
READ(3,1234) (TITLE(I),I=1,40)
WRITE(2,1235) (TITLE(I),I=1,40)
1234 FORMAT(10A8/(10A8))
1235 FORMAT(//20X,10A8/20X,10A8/20X,10A8/20X,10A8)
5 READ (3,1000) NSTA,NROMS,NENC,NVL,MD,NSP,ML,NW,NALPHA
READ(3,1781) (AREAC(I),I=1,NSTA)
1781 FORMAT(8E10.4)
WRITE(2,1782) (AREAC(I),I=1,NSTA)
1782 FORMAT(' CROSS SECTIONAL AREA =',8E10.4)
C
IF(NSTA.LE.0) CALL EXIT
READ(3,1001) SPAN,CORD,HMASS,CL,CV,XHFO,DHF
READ (3,1001) CB,XLBP,BEAM,DRAFT,RHO,GRAV,XCG,ZCG
READ (3,1001) ZETAA,RYY,RXX,RXZ,RZZ,GM,ROLVMX,VISCK
READ(3,1001) XCGP,YCGP,ZCGP,ZDECK,HS,XCGFP
READ (3,1001) (XI(I),I=1,NSTA)
READ (3,1001) (BETA(I),I=1,NENC)
READ(3,1000) (LOSH(I),I=1,NENC)
READ(3,1001) (ALPHA(I),I=1,NALPHA)
IF(NW.GE.1) GO TO 1
READ (3,1001) (OMEGA(I),I=1,NROMS)
GO TO 2
1 READ(3,1001) (ZETA13(I),OMP(I),I=1,NW)
DO 3 I=1,NROMS
3 OMEGA(I)=OMEGAN(I)
2 HSH=HS*0.5
DO 4 I=1,NROMS
4 OMEGAM(I)=OMEGA(I)

```

```

DO 61 J=1,NSTA                                SWA00570
XI(J)=XCGFP-XI(J)                              SWA00580
READ(3,1901) NPP(J)                             SWA00590
NPN=NPP(J)                                       SWA00600
READ(3,1902) (XPT(I,J),I=1,NPN)                SWA00610
READ(3,1902) (YPT(I,J),I=1,NPN)                SWA00620
61 CONTINUE                                       SWA00630
NSTA1=NSTA-1                                     SWA00640
DO 10 I=1,NSTA1                                  SWA00650
10 DX(I)=XI(I)-XI(I+1)                          SWA00660
DO 62 J=1,NSTA                                   SWA00670
NPN=NPP(J)                                       SWA00680
DO 63 I=1,NPN                                    SWA00690
XPT(I,J)=XPT(I,J)+HSH                           SWA00700
63 YPT(I,J)=-YPT(I,J)                           SWA00710
YM(J)=(XPT(NPN,J)-XPT(1,J))*2.0                SWA00720
62 CONTINUE                                       SWA00730
WRITE(2,2000) NSTA,NROMS,NENC,NVL,MD,NSP,ML,NW,NALPHA SWA00740
WRITE(2,8800) SPAN,CORD,HMASS,CL,CV,XHFO,DHF     SWA00750
8800 FORMAT('0',T19,'SPAN',T33,'CHORD',T48,'HMASS',T66,'CL',T81,'CV',
CT94,'XHFO',T110,'DHF'/11X,7G15.6)              SWA00770
WRITE(2,2001) CB,XLBP,BEAM,DRAFT,RHO,GRAV,XCG,ZCG SWA00780
WRITE(2,2002) ZETAA,RYX,RXX,RXZ,RZZ,GM,ROVMX,VISCK SWA00790
WRITE(2,2017) XCGP,YCGP,ZCGP,ZDECK,HS,XCGFP     SWA00800
WRITE(2,2003) (XI(I),I=1,NSTA)                   SWA00810
WRITE(2,2004) (YM(I),I=1,NSTA)                   SWA00820
WRITE(2,2007) (BETA(I),I=1,NENC)                 SWA00830
WRITE(2,2024) (LOSH(I),I=1,NENC)                 SWA00840
WRITE(2,2025) (ALPHA(I),I=1,NALPHA)              SWA00850
WRITE(2,2008) (OMEGA(I),I=1,NROMS)               SWA00860
WRITE(2,2009) (DX(I),I=1,NSTA1)                  SWA00870
PI=3.141593                                       SWA00880
RHOC=RHO                                           SWA00890
RAD=57.29578                                       SWA00900
DISPL=CB*XLBP*BEAM*DRAFT                          SWA00910
GMASS=DISPL*RHO                                    SWA00920
DMN=GMASS*GRAV                                     SWA00930
WRITE(2,2010) DISPL,GMASS,DMN                    SWA00940
WRITE(2,2014)                                       SWA00950
DO 75 J=1,NSTA                                       SWA00960
NPN=NPP(J)                                       SWA00970
WRITE(2,2019) J,NPN                                SWA00980
WRITE(2,2020) (XPT(I,J),I=1,NPN)                SWA00990
75 WRITE(2,2021) (YPT(I,J),I=1,NPN)              SWA01000
YYI=GMASS*RYX*RYX                                  SWA01010
XXI=GMASS*RXX*RXX                                  SWA01020
XZI=GMASS*RXZ*RXZ                                  SWA01030
ZZI=GMASS*RZZ*RZZ                                  SWA01040
C                                                    SWA01050
IE=0                                                SWA01060
DO 90 N=1,NVL                                       SWA01070
IF(IE.GE.1) GO TO 90                               SWA01080
READ(3,1001) V                                       SWA01090
DO 80 M=1,NENC                                       SWA01100
IF(IE.GE.1) GO TO 80                               SWA01110
BET=BETA(M)                                         SWA01120

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BAT=BET	SWA01130
BER=BET	SWA01140
LS=LOSH(M)	SWA01150
DO 60 LL=1,NALPHA	SWA01160
IF(LS.EQ.0) GO TO 81	SWA01170
BET=BER+ALPHA(LL)	SWA01180
81 IF(LS.EQ.0.AND.LL.GE.2) GO TO 60	SWA01190
BETAA=BET/57.29578	SWA01200
SBET=SIN(BETAA)	SWA01210
CBET=COS(BETAA)	SWA01220
WRITE(2,2023)	SWA01230
WRITE(2,1903)	SWA01240
NROMA=NROMS	SWA01250
CALL ENFQ(NROMA,NROMS,V,CBET,GRAV)	SWA01260
IF(NROMA.LE.0) GO TO 60	SWA01270
DO 70 L=1,NROMA	SWA01280
IF(IE.GE.1) GO TO 70	SWA01290
OMO=OMEGA(L)	SWA01300
WN=OMO*OMO/GRAV	SWA01310
OM2=WN*CBET	SWA01320
OM=OMO-V*OM2	SWA01330
OMEGAE(L)=OM	SWA01340
RTO=V/OM	SWA01350
RT=RTO/OM	SWA01360
GMALBP=GMASS*XLBP	SWA01370
XLOG=XLBP/GRAV	SWA01380
XLGS=SQRT(XLOG)	SWA01390
FRNO=V/XLGS/GRAV	SWA01400
EMU=OM*XLGS	SWA01410
WLN=2.*PI/WN	SWA01420
XLR=WLN/XLBP	SWA01430
WRITE(2,2023)	SWA01440
WRITE(2,2011) V,BET ,OMO,OM,XLR,FRNO,EMU	SWA01450
ICAT=0	SWA01460
IF(ML.EQ.0) GOTO 83	SWA01470
IF(V.GT.0) GOTO 83	SWA01480
ICAT=2	SWA01490
IF(ABS(BET-90.0).LT.5.0) GOTO 84	SWA01500
ABET=ABS(BET-180.0)	SWA01510
IF(ABET.LT.15.0.OR.ABET.GT.165.0) ICAT=3	SWA01520
GOTO 85	SWA01530
84 ICAT=1	SWA01540
85 IF(ICAT.EQ.3) GO TO 83	SWA01550
IXYN=NSTA/2+1	SWA01560
83 CALL CAT2DS(M,OMO,OM,CBET ,SBET ,NSTA,HS)	SWA01570
IF(IE.GE.1) GO TO 666	SWA01580
IF(MD.EQ.2) GO TO 50	SWA01590
CALL GMSUPH(GMA,YYI,GMASS)	SWA01600
CALL ASUPH(A,AZZ,BZZ,V,RT,A33,B33,XI,DX,NSTA,NSP)	SWA01610
CALL BSUPH(B,AZZ,BZZ,V,RT,A33,B33,XI,DX,NSTA,NSP)	SWA01620
CALL CSUPH(C,RHO,GRAV,YM,XI,DX,NSTA,NSP)	SWA01630
CALL FSUPH(F,RHO,DMN,ZETAA,F3,H3,RTO,XI,DX,NSTA,NSP)	SWA01640
IF(SPAN.LE.0.001) GOTO 82	SWA01650
CHLR=RHO*SPAN*CORD	SWA01660
HA3=CHLR*CORD*.7853982	SWA01670
HA3=HA3+HMASS	SWA01680

CHDR=CHLR*CV*OM*.8488264	SWA01690
CHLR=CHLR*V*CL/2.0	SWA01700
ZUNIT=(0.0,1.0)	SWA01710
HF3=CEXP(WN*DHF-ZUNIT*WN*XHFO*CBET)	SWA01720
HF3=HF3*CHLR*ZUNIT*OMO/DMN	SWA01730
CALL HYFOIL(A,B,C,F,CHLR,CHDR,HF3,XHFO,HA3,V)	SWA01740
82 CALL MTSUPH(ETA,GMA,A,B,C,F,OM,DMN)	SWA01750
CALL ZANGLE(ETA(3),HEAVE,PHASE3)	SWA01760
CALL ZANGLE(ETA(5),PITCH,PHASE5)	SWA01770
ESPC3(L)=HEAVE	SWA01780
ESPC5(L)=PITCH	SWA01790
PITCH=PITCH*WLN*0.5/PI	SWA01800
WRITE(2,2012) HEAVE,PHASE3,PITCH,PHASE5	SWA01810
IF(MD.EQ.1) GO TO 71	SWA01820
50 CALL GMSWRY(GMA,ZCG,XXI,ZZI,XZI,GMASS)	SWA01830
CALL ASWRY(A,V,A22,A44,A24,B22,B44,B24,XI,DX,AXX,AYY,AYX,BYY,BYX	SWA01840
C,RT,NSTA,NSP)	SWA01850
CALL BSWRY(B,V,A22,A44,A24,B22,B44,B24,XI,DX,AXX,AYY,AYX,BYY,BYX	SWA01860
C,RT,ROLMX,VISCK,NSTA,NSP)	SWA01870
CALL CSWRY(C,DMN,GM)	SWA01880
CALL FSWRY(F,RHO,ZETAA,F2,F4,H2,H4,DMN,RTO,XI,DX,NSTA,NSP)	SWA01890
CALL MTSWRY(ETA,GMA,A,B,C,F,OM,DMN)	SWA01900
CALL ZANGLE(ETA(2),SWAY,PHASE2)	SWA01910
CALL ZANGLE(ETA(4),ROLL,PHASE4)	SWA01920
CALL ZANGLE(ETA(6),YAW,PHASE6)	SWA01930
ESPC2(L)=SWAY	SWA01940
ESPC4(L)=ROLL	SWA01950
ESPC6(L)=YAW	SWA01960
ROLL=ROLL*WLN*0.5/PI	SWA01970
YAW = YAW*WLN*0.5/PI	SWA01980
WRITE(2,2013) SWAY,PHASE2,ROLL,PHASE4,YAW,PHASE6	SWA01990
GO TO 71	SWA02000
666 WRITE(2,667)	SWA02010
WRITE(2,668) IE,V,BETAA,OMO	SWA02020
GO TO 70	SWA02030
C	SWA02040
71 IF(ML.EQ.0) GO TO 70	SWA02050
IF(V.GT.0.) GO TO 32	SWA02060
IF(MD.EQ.2) CALL CSUPH(C,RHO,GRAV,YM,XI,DX,NSTA,NSP)	SWA02070
C33=C(3,3)	SWA02080
C35=C(3,5)	SWA02090
WARE=TRAP(DX,YM,NSTA,NSP)*0.5	SWA02100
DO 66 I=1,NSTA	SWA02110
NPN=NPP(I)	SWA02120
66 DYP(I)= YM(I)*(XPT(NPN,I)+XPT(1,I))*0.25	SWA02130
WARF=TRAP(DX,DYP,NSTA,NSP)	SWA02140
YBP =WARF/WARE	SWA02150
DO 555 I=1,6	SWA02160
555 QDD(I)=(0.0,0.0)	SWA02170
DBET=BET	SWA02180
RHD=RHO	SWA02190
GRAD=GRAV	SWA02200
IF(ICAT-2) 87,87,88	SWA02210
87 NPL=NPP(IXYN)	SWA02220
DO 89 IN=1,NPL	SWA02230
XL(IN)=XPT(IN,IXYN)	SWA02240

89	YL(IN)=YPT(IN,IXYN)	SWA02250
	IF(ICAT.EQ.1) GOTO 86	SWA02260
	IF(XLR.GE.1.50) GOTO 88	SWA02270
	CALL DBLIQ(NPL,OM,DBET,DMN,GRAD,RHD)	SWA02280
86	XLF=XI(IXYN)	SWA02290
	CALL RECT(F,DMN,DISPL,NPL,OM2,RHD)	SWA02300
	IF(MD.EQ.2) GOTO 41	SWA02310
	CALL MTSUPH(ETA,GMA,A,B,C,F,OM,DMN)	SWA02320
	IF(MD.EQ.1) GOTO 88	SWA02330
41	CALL MTSWRY(ETA,GMA,A,B,C,F,OM,DMN)	SWA02340
88	IF(MD.EQ.2) GO TO 73	SWA02350
	CALL ABSUPH(A,B,A23,B23,A43,B43,XI,DX,NSTA,NSP)	SWA02360
	IF(MD.EQ.1) GO TO 74	SWA02370
73	CALL ABSWRY(A,B,A32,B32,A34,B34,XI,DX,NSTA,NSP)	SWA02380
74	CALL DYLOAD(VLOAD,ETA,A,B,XI,DX,CBET,RHO,GRAV,NSTA,NSP,OM,MD,ZCG)	SWA02390
	IF(MD.EQ.2) GO TO 72	SWA02400
	CALL ZANGLE(VLOAD(2),TRANSF,PHAL2)	SWA02410
	CALL ZANGLE(VLOAD(4),BENMOM,PHAL4)	SWA02420
	CALL ZANGLE(VLOAD(6),YAWMOM,PHAL6)	SWA02430
	VSPC2(L)=TRANSF/2240.	SWA02440
	VSPC4(L)=BENMOM/2240.	SWA02450
	VSPC6(L)=YAWMOM/2240.	SWA02460
	TRANSF=TRANSF*XLBP/DMN/ZETAA	SWA02470
	BENMOM=BENMOM/DMN/ZETAA	SWA02480
	YAWMOM=YAWMOM/DMN/ZETAA	SWA02490
	WRITE(2,2015) TRANSF,PHAL2,BENMOM,PHAL4,YAWMOM,PHAL6	SWA02500
	IF(MD.EQ.1) GO TO 70	SWA02510
72	CALL ZANGLE(VLOAD(3),VERTSF,PHAL3)	SWA02520
	CALL ZANGLE(VLOAD(5),TORMOM,PHAL5)	SWA02530
	VSPC3(L)=VERTSF/2240.	SWA02540
	VSPC5(L)=TORMOM/2240.	SWA02550
	VERTSF=VERTSF*XLBP/DMN/ZETAA	SWA02560
	TORMOM=TORMOM/DMN/ZETAA	SWA02570
	WRITE(2,2018) VERTSF,PHAL3,TORMOM,PHAL5	SWA02580
	GO TO 70	SWA02590
32	WRITE(2,2016)	SWA02600
		SWA02610
C		SWA02620
70	CONTINUE	SWA02630
	IF(IE.EQ.1) GO TO 80	SWA02640
	IF(NW.EQ.0) GO TO 80	SWA02650
	CALL SPCTRM(GRAV,NW,NSP,NROMA,MD,ML,V,LS,LL,BAT)	SWA02660
60	CONTINUE	SWA02670
	IF(LS.EQ.0) GO TO 80	SWA02680
	CALL SHORT(MD,ML,NW,V,NALPHA,BER,GRAV)	SWA02690
80	CONTINUE	SWA02700
90	CONTINUE	SWA02710
100	CONTINUE	SWA02720
	GO TO 5	SWA02730
1000	FORMAT(16I5)	SWA02740
1001	FORMAT(8G10.4)	SWA02750
1901	FORMAT(I5)	SWA02760
1902	FORMAT(7F10.4)	SWA02770
1903	FORMAT(/' REGULAR WAVE RESPONSE : '////)	SWA02780
2000	FORMAT('1',T19,'NSTA',T33,'NROMS',T49,'NENC',T65,'NVL',T81,'MD',T9SWA02780	
	C5,'NSP',T111,'ML',T126,'NW'/7X,8I15/T17,'NALPHA'/7X,8I15)	SWA02790
2001	FORMAT('0',T21,'CB',T34,'XLBP',T49,'BEAM',T63,'DRAFT',T78,' RHO',SWA02800	

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CT94,'GRAV',T110,'XCG',T125,'ZCG'/11X,8G15.6) SWA02810
2002 FORMAT('O',T18,'ZETAA',T35,'RY',T50,'RXX',T65,'RXZ',T80,'RZZ',T96SWA02820
C,'GM',T108,'ROLMX',T123,'VISCK'/11X,8G15.6) SWA02830
2003 FORMAT('OSTATIONS ',8G15.6/(11X,8G15.6)) SWA02840
2004 FORMAT('OFULL BEAMS',8G15.6/(11X,8G15.6)) SWA02850
2007 FORMAT('OBETAAS ',8G15.6/(11X,8G15.6)) SWA02860
2008 FORMAT('OFREQUENCY ',8G15.6/(11X,8G15.6)) SWA02870
2009 FORMAT('OXI SPACING',8G15.6/(11X,8G15.6)) SWA02880
2010 FORMAT('O',T18,'DISPL',T33,'GMASS',T50,'DMN'/11X,8G15.6) SWA02890
2011 FORMAT('O VELOCITY FT/S',G15.6,' HEADING ANGLE DEG',G15.4,' O-ESWA02900
EGA',G15.6,' OMEGAE',G15.6/' WAVE-L/XLBP',G15.6,9X,'FROUDE NOSWA02910
C.',G15.6,'NON-DIM.ENC.FREQ.',G15.6/) SWA02920
2012 FORMAT(///' HEAVE ',G15.6,5X,'PHASE ',G15.6/' PITCH ',G15.6,5X,'PHSWA02930
HASE ',G15.6) SWA02940
2013 FORMAT(///' SWAY ',G15.6,5X,'PHASE ',G15.6/' ROLL ',G15.6,5X,'PHSWA02950
HASE ',G15.6/' YAW ',G15.6,5X,'PHASE ',G15.6) SWA02960
2014 FORMAT(///' SECTIONAL OFFSETS OF BODY PLAN'/) SWA02970
2015 FORMAT(///' TRANF ',G15.6,5X,'PHASE ',G15.6 /' BENMOM ',G15.6 SWA02980
C,5X,'PHASE ',G15.6/' YAWMOM ',G15.6,5X,'PHASE ',G15.6) SWA02990
2016 FORMAT(///' THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NONSWA03000
C-ZERO SHIP VELOCITY ') SWA03010
2017 FORMAT('O',T19,'XCGP',T34,'YCGP',T49,'ZCGP',T63,'ZDECK',T79,'HS', SWA03020
CT93,'XCGFP'/11X,8G15.6) SWA03030
2018 FORMAT(///' VERTSF ',G15.6,5X,'PHASE',G15.6/ SWA03040
C' TORMOM ',G15.6,5X,'PHASE',G15.6) SWA03050
2019 FORMAT('OSTATION NO.',I5,5X,' NO.OF POINTS',I5) SWA03060
2020 FORMAT('O X PTS.',8G15.6/(11X,8G15.6)) SWA03070
2021 FORMAT('O Y PTS.',8G15.6/(11X,8G15.6)) SWA03080
2023 FORMAT(////) SWA03090
2024 FORMAT('OLC=0 SC=1 ',8I15/(11X,8I15)) SWA03100
2025 FORMAT('OALPHA ',8G15.6/(11X,8G15.6)) SWA03110
667 FORMAT(/////1X,'MATRIX IS SINGULAR AT',T25,'STATION NO.',T40, SWA03120
1 'VELOCITY',T50,'BETA',T60,'WAVE FREQ.'/) SWA03130
668 FORMAT(/1X,T30,I5,T40,F10.5,T50,F10.5,T60,F10.5) SWA03140
END SWA03150
SUBROUTINE CAT2DS(MM,OMO,OM,CBET,SBET,NSTA,HS) SWA03160
IMPLICIT COMPLEX(Q) SWA03170
COMPLEX F2,F3,F4,H2,H3,H4,ZUNIT SWA03180
COMMON/CMFRDB/QDD(6),QL2,QL3,QL4,QFH2,QFH3,QFH4,ZUNIT,XL(31) SWA03190
C, YL(31),ICAT,IXYN SWA03200
COMMON/CATMN/NPP(27),XPT(31,27),YPT(31,27),XI(27),GRAV,RHO,IE SWA03210
C, MD,ML SWA03220
COMMON/CAT2D/ X(30),Y(30),XX(30),YY(30),DEL(30),SNE(30),CSE(30) SWA03230
C, FR2(30),FR3(30),FR4(30),BLGH(30,30),BLGS(30,30) SWA03240
C, YLGH(30,30),YLGS(30,30) SWA03250
COMMON /ABFWH/ A22(27),A33(27),A44(27),A24(27),B22(27),B33(27) SWA03260
C ,B44(27),B24(27),F2(27),F3(27),F4(27),H2(27),H3(27),H4(27) SWA03270
C, A23(27),A43(27),B23(27),B43(27),A32(27),A34(27),A42(27),B32(27) SWA03280
C, B34(27),B42(27) SWA03290
COMMON/DYOD/V02(27),V03(27),V04(27),V05(27),V06(27) SWA03300
C ,BET,XCGP,YCGP,ZCGP,YBP,C33,C35,GMASS,WN ,ZETAA,ZDECK SWA03310
COMMON/CNST/ NON,NUT,NOE,UN,OMEGA,TPI,DEW,DOG,K,ID,GR,GRS,UNW SWA03320
1, OMEGAW,CBETA,SBETA,XSTA SWA03330
2, AM22,AM23,AM24,AM32,AM33,AM34,AM42,AM43,AM44 SWA03340
3, BM22,BM23,BM24,BM32,BM33,BM34,BM42,BM43,BM44 SWA03350
4, VT2,VT3,VT4,QF2,QF3,QF4,QH2,QH3,QH4 SWA03360

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COM		SWA03370
	COMMON/ARE/AREAC(50)	SWA03380
COM		SWA03390
	DIMENSION XA(31),YA(31),DUL(30)	SWA03400
COM		SWA03410
	DIMENSION XQ(31),YQ(31)	SWA03420
COM		SWA03430
	GR=GRAV	SWA03440
	GRS=SQRT(GR)	SWA03450
	G=1.0	SWA03460
	PI=3.1415927	SWA03470
	HPI=.5*PI	SWA03480
	TPI=2.*PI	SWA03490
	CBETA=CBET	SWA03500
	SBETA=SBET	SWA03510
	OMEGAW=OMO	SWA03520
C		SWA03530
	UNW=OMEGAW*OMEGAW/GR	SWA03540
	UN=OM*OM/GR	SWA03550
	OMEGA=SQRT(ABS(UN))	SWA03560
	ROM=RHO/OM	SWA03570
C		SWA03580
	DO 20 K=1,NSTA	SWA03590
	IF(IE.GE.1) GO TO 20	SWA03600
	NUT=NPP(K)	SWA03610
	NON=NUT-1	SWA03620
	IF(NON.LE.2) GO TO 88	SWA03630
	XSTA=XI(K)	SWA03640
C		SWA03650
	DO 30 I=1,NUT	SWA03660
	XA(I)=XPT(I,K)	SWA03670
	YA(I)=YPT(I,K)	SWA03680
30	CONTINUE	SWA03690
C		SWA03700
	DO 64 J=1,NON	SWA03710
	XX(J)=.5*(XA(J)+XA(J+1))	SWA03720
	XINT=XA(J+1)-XA(J)	SWA03730
	YINT=YA(J+1)-YA(J)	SWA03740
	DUL(J)=SQRT(XINT**2+YINT**2)	SWA03750
COM		SWA03760
	XQ(J)=XINT	SWA03770
	YQ(J)=YINT	SWA03780
COM		SWA03790
	SNE(J)=YINT/DUL(J)	SWA03800
64	CSE(J)=XINT/DUL(J)	SWA03810
	DO 78 J=1,NUT	SWA03820
	X(J)=XA(J)	SWA03830
78	Y(J)=YA(J)	SWA03840
53	DO 54 J=1,NUT	SWA03850
	X(J)=X(J)/G	SWA03860
54	Y(J)=Y(J)/G	SWA03870
24	DO 25 J=1,NON	SWA03880
	XX(J)=.5*(X(J)+X(J+1))	SWA03890
	YY(J)=.5*(Y(J)+Y(J+1))	SWA03900
25	DEL(J)=DUL(J)/G	SWA03910
	NOE=2*NON	SWA03920

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DO 69 J=1,NON
FR2(J)=-SNE(J)
FR3(J)=CSE(J)
69 FR4(J)=YY(J)*SNE(J)+XX(J)*CSE(J)
PDM=0.5*(X(NUT)-X(1))
VOL=PI*PDM*PDM
DEW=1.
DO 1 I=1,NON
COM
COM      IMPLEMENTATION OF APPROXIMATE METHOD ...
C      XM1=XX(I)-X(1)
C      YM1=YY(I)-Y(1)
C      XP1=XX(I)+X(1)
C      YP1=YY(I)+Y(1)
C      FPR1=.5*ALOG(XM1**2+YM1**2)
C      FPL1=.5*ALOG(XP1**2+YM1**2)
C      FCR1=.5*ALOG(XM1**2+YP1**2)
C      FCL1=.5*ALOG(XP1**2+YP1**2)
COM
C      APR1=ATAN2(YM1,XM1)
C      APL1=ATAN2(YM1,XP1)
C      ACR1=ATAN2(YP1,XM1)
C      ACL1=ATAN2(YP1,XP1)
COM
C      RL1N=XQ(1)*XM1+YQ(1)*YM1
C      RL1D=YQ(1)*XM1-XQ(1)*YM1
C      RL2N=XQ(1)*XM1-YQ(1)*YP1
C      RL2D=XQ(1)*YP1+YQ(1)*XM1
C      RL3N=YQ(1)*YM1-XQ(1)*XP1
C      RL3D=XQ(1)*YM1+YQ(1)*XP1
C      RL4N=XQ(1)*XP1+YQ(1)*YP1
C      RL4D=XQ(1)*YP1-YQ(1)*XP1
C      APR1N=ATAN(RL1N/RL1D)
C      ACR1N=ATAN(RL2N/RL2D)
C      APL1N=ATAN(RL3N/RL3D)
C      ACL1N=ATAN(RL4N/RL4D)
COM
DO 1 J=1,NON
C      XM2=XX(I)-X(J+1)
C      YM2=YY(I)-Y(J+1)
C      XP2=XX(I)+X(J+1)
C      YP2=YY(I)+Y(J+1)
C      FPR2=.5*ALOG(XM2**2+YM2**2)
C      FPL2=.5*ALOG(XP2**2+YM2**2)
C      FCR2=.5*ALOG(XM2**2+YP2**2)
C      FCL2=.5*ALOG(XP2**2+YP2**2)
COM
C      APR2=ATAN2(YM2,XM2)
C      J1=J+1
C      IF(XM2.GT.0.0) GO TO 4
C      IF(J1.GT.1) GO TO 9
C      IF(YM2.LT.0.0) APR2=APR2+TPI
C      GO TO 5
C      9 IF(YM2.GE.0.0) APR2=APR2-TPI
C      5 IF(YP2.LT.0.0) GO TO 4
C      ACR2=-PI

```

```

C      GO TO 3
C
C
C      4 ACR2=ATAN2 (YP2, XM2)
C      3 ACL2=ATAN2 (YP2, XP2)
C      APL2=ATAN2 (YM2, XP2)
COM
C      RL1N=XQ (J) *XM2+YQ (J) *YM2
C      RL1D=YQ (J) *XM2-XQ (J) *YM2
C      RL2N=XQ (J) *XM2-YQ (J) *YP2
C      RL2D=XQ (J) *YP2+YQ (J) *XM2
C      RL3N=YQ (J) *YM2-XQ (J) *XP2
C      RL3D=XQ (J) *YM2+YQ (J) *XP2
C      RL4N=XQ (J) *XP2+YQ (J) *YP2
C      RL4D=XQ (J) *YP2-YQ (J) *XP2
C      APR2N=ATAN (RL1N/RL1D)
C      ACR2N=ATAN (RL2N/RL2D)
C      APL2N=ATAN (RL3N/RL3D)
C      ACL2N=ATAN (RL4N/RL4D)
COM
C      SIMJ=SNE (I) *CSE (J) -SNE (J) *CSE (I)
C      CIMJ=CSE (I) *CSE (J) +SNE (I) *SNE (J)
C      SIPJ=SNE (I) *CSE (J) +SNE (J) *CSE (I)
C      CIPJ=CSE (I) *CSE (J) -SNE (I) *SNE (J)
C      DPNR=SIMJ * (FPR1-FPR2) +CIMJ * (APR1-APR2)
COM
C      DPNRL1=SIMJ * (FPR1-FPR2) +CIMJ * (APR1N-APR2N)
C      WRITE (2, 1561)
C1561  FORMAT (' I J SIMJ CIMJ APR1 APR2 APR1N APR2N
C      *PR1 FPR2')
C      WRITE (2, 1562) I, J, SIMJ, CIMJ, APR1, APR2, APR1N, APR2N, FPR1, FPR2
C1562  FORMAT (2 (1X, I3), 8 (1X, E10.4))
      IF (I.EQ.J) THEN
          DPNRLA=PI
      ELSE
          DPNRLA=DUL (J) * (SNE (I) * (XX (I) -XX (J)) -CSE (I) * (YY (I) -YY (J)))
          RIJ2=(XX (I) -XX (J)) **2+(YY (I) -YY (J)) **2
          DPNRLA=DPNRLA/RIJ2
      ENDIF
COM
C 99  PPR=CSE (J) * (XM1 *FPR1-YM1 *APR1-XM1-XM2 *FPR2+YM2 *APR2+XM2) +SNE (J) * (YSWA04890
C      1M1 *FPR1+XM1 *APR1-YM1-YM2 *FPR2-XM2 *APR2+YM2)
COM
C      PPR1=CSE (J) * (XM1 *FPR1-XM1-XM2 *FPR2+XM2-YM1 * (APR1N-APR2N)) +SNE (J) * (SWA04920
C      1YM1 *FPR1-YM1-YM2 *FPR2+YM2+XM1 * (APR1N-APR2N))
      IF (I.EQ.J) THEN
          PPR1A=DUL (J) * (ALOG (.5 *DUL (J)) -1.)
      ELSE
          PPR1A=.5 *DUL (J) *ALOG (RIJ2)
      ENDIF
COM
C      DPNL=SIPJ * (FPL2-FPL1) +CIPJ * (APL2-APL1)
COM
C      DPNLL3=SIPJ * (FPL2-FPL1) +CIPJ * (APL2N-APL1N)
      DPNLLA=DUL (J) * (SNE (I) * (XX (I) +XX (J)) -CSE (I) * (YY (I) -YY (J)))
      RIJ2=(XX (I) +XX (J)) **2+(YY (I) -YY (J)) **2

```

```

      DPNLLA=DPNLLA/RIJ2
COM
C      PPL=CSE(J)*(XP2*FPL2-YM2*APL2-XP2-XP1*FPL1+YM1*APL1+XP1)+SNE(J)*(YSWA05070
C      1M1*FPL1+XP1*APL1+YM2-YM2*FPL2-XP2*APL2-YM1)
COM
C      PPL3=CSE(J)*(XP2*FPL2-XP2-XP1*FPL1+XP1+YM1*(APL1N-APL2N))+SNE(J)*(SWA05100
C      1YM1*FPL1+YM2-YM2*FPL2-YM1+XP1*(APL1N-APL2N))
      PPL3A=.5*DUL(J)*ALOG(RIJ2)
COM
C      DCNR=SIPJ*(FCR1-FCR2)+CIPJ*(ACR1-ACR2)
COM
C      DCNRL2=SIPJ*(FCR1-FCR2)+CIPJ*(ACR2N-ACR1N)
      DCNRLA=DUL(J)*(SNE(I)*(XX(I)-XX(J))-CSE(I)*(YY(I)+YY(J)))
      RIJ2=(XX(I)-XX(J))**2+(YY(I)+YY(J))**2
      DCNRLA=DCNRLA/RIJ2
COM
C      PCR=CSE(J)*(XM1*FCR1-YP1*ACR1-XM1-XM2*FCR2+YP2*ACR2+XM2)+SNE(J)*(YSWA05210
C      1P2*FCR2+XM2*ACR2+YP1-YP1*FCR1-XM1*ACR1-YP2)
COM
C      PCR2=CSE(J)*(XM1*FCR1-XM1-XM2*FCR2+XM2+YP1*(ACR1N-ACR2N))+SNE(J)*(SWA05240
C      1YP2*FCR2+YP1-YP1*FCR1-YP2+XM1*(ACR1N-ACR2N))
      PCR2A=.5*DUL(J)*ALOG(RIJ2)
COM
C      DCNL=SIMJ*(FCL2-FCL1)+CIMJ*(ACL2-ACL1)
COM
C      DCNLL4=SIMJ*(FCL2-FCL1)+CIMJ*(ACL1N-ACL2N)
      DCNLLA=DUL(J)*(SNE(I)*(XX(I)+XX(J))-CSE(I)*(YY(I)+YY(J)))
      RIJ2=(XX(I)+XX(J))**2+(YY(I)+YY(J))**2
      DCNLLA=DCNLLA/RIJ2
COM
C      PCL=CSE(J)*(XP2*FCL2-YP2*ACL2-XP2-XP1*FCL1+YP1*ACL1+XP1)+SNE(J)*(YSWA05350
C      1P2*FCL2+XP2*ACL2-YP2-YP1*FCL1-XP1*ACL1+YP1)
C      PCL4=CSE(J)*(XP2*FCL2-XP2-XP1*FCL1+XP1-YP1*(ACL1N-ACL2N))+SNE(J)*(SWA05370
C      1YP2*FCL2-YP2-YP1*FCL1+YP1+XP1*(ACL1N-ACL2N))
      PCL4A=.5*DUL(J)*ALOG(RIJ2)
COM
C      WRITE(2,1218)
C1218 FORMAT(1X,' I J XX(I) YY(I) X(J) Y(J) X(JSWA05420
C      *+1) Y(J+1) SNE(I) -CSE(I) SNE(J) -CSE(J)') SWA05430
C      WRITE(2,1219) I,J,XX(I),YY(I),X(J),Y(J),X(J+1),Y(J+1),SNE(I),-CSE(SWA05440
C      *I),SNE(J),-CSE(J) SWA05450
C1219 FORMAT(2(1X,I3),10(1X,E10.4)) SWA05460
C      WRITE(2,1211) DPNR,DPNRL1,DPNRLA,PPR,PPR1,PPR1A SWA05470
C1211 FORMAT(' L1 OLD NEW NEWA =',3E10.4,' K1 OLD NEW NEWA =',3E10.4) SWA05480
C1311 FORMAT(' L2 OLD NEW NEWA =',3E10.4,' K2 OLD NEW NEWA =',3E10.4) SWA05490
C1411 FORMAT(' L3 OLD NEW NEWA =',3E10.4,' K3 OLD NEW NEWA =',3E10.4) SWA05500
C1511 FORMAT(' L4 OLD NEW NEWA =',3E10.4,' K4 OLD NEW NEWA =',3E10.4) SWA05510
C      WRITE(2,1311) DCNR,DCNRL2,DCNRLA,PCR,PCR2,PCR2A SWA05520
C      WRITE(2,1411) DPNL,DPNLL3,DPNLLA,PPL,PPL3,PPL3A SWA05530
C      WRITE(2,1511) DCNL,DCNLL4,DCNLLA,PCL,PCL4,PCL4A SWA05540
C
C      USE APPROXIMATE INTEGRALS ... SWA05560
      DPNR=DPNRLA SWA05570
      PPR=PPR1A SWA05580
      DCNR=DCNRLA SWA05590
      PCR=PCR2A SWA05600

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	DPNL=DPNLLA	SWA05610
	PPL=PPL3A	SWA05620
	DCNL=DCNLLA	SWA05630
	PCL=PCL4A	SWA05640
C		SWA05650
COM		SWA05660
	IF(MD.EQ.2) GO TO 301	SWA05670
	BLGH(I,J)=DPNR+ DPNL-DCNR- DCNL	SWA05680
	YLGH(I,J)=PPR+ PPL-PCR- PCL	SWA05690
	IF(MD.EQ.1) GO TO 302	SWA05700
301	BLGS(I,J)=DPNR- DPNL-DCNR+ DCNL	SWA05710
	YLGSI(I,J)=PPR- PPL-PCR+ PCL	SWA05720
302	IF(J-NON)2,1,1	SWA05730
COM		SWA05740
	2 CONTINUE	SWA05750
C	2 XM1=XM2	SWA05760
C	YM1=YM2	SWA05770
C	XP1=XP2	SWA05780
C	YP1=YP2	SWA05790
C	FPR1=FPR2	SWA05800
C	FPL1=FPL2	SWA05810
C	FCR1=FCR2	SWA05820
C	FCL1=FCL2	SWA05830
COM		SWA05840
C	APR1=APR2	SWA05850
C	APL1=APL2	SWA05860
C	ACR1=ACR2	SWA05870
C	ACL1=ACL2	SWA05880
COM		SWA05890
C	APR1N=APR2N	SWA05900
C	APL1N=APL2N	SWA05910
C	ACR1N=ACR2N	SWA05920
C	ACL1N=ACL2N	SWA05930
COM		SWA05940
	1 CONTINUE	SWA05950
C		SWA05960
	45 CALL FREQ(MD,ML)	SWA05970
C		SWA05980
	GO TO(89,28),ID	SWA05990
	28 IE=K	SWA06000
	GO TO 20	SWA06010
88	A22(K)=0.0	SWA06020
	B22(K)=0.0	SWA06030
	A23(K)=0.0	SWA06040
	B23(K)=0.0	SWA06050
	A24(K)=0.0	SWA06060
	B24(K)=0.0	SWA06070
	A32(K)=0.0	SWA06080
	B32(K)=0.0	SWA06090
	A33(K)=0.0	SWA06100
	B33(K)=0.0	SWA06110
	A34(K)=0.0	SWA06120
	B34(K)=0.0	SWA06130
	A42(K)=0.0	SWA06140
	B42(K)=0.0	SWA06150
	A43(K)=0.0	SWA06160

B43(K)=0.0	SWA06170
A44(K)=0.0	SWA06180
B44(K)=0.0	SWA06190
F2(K)=(0.,0.)	SWA06200
F3(K)=(0.,0.)	SWA06210
F4(K)=(0.,0.)	SWA06220
H2(K)=(0.,0.)	SWA06230
H3(K)=(0.,0.)	SWA06240
H4(K)=(0.,0.)	SWA06250
V02(K)=0.0	SWA06260
V03(K)=0.0	SWA06270
V04(K)=0.0	SWA06280
V05(K)=0.0	SWA06290
V06(K)=0.0	SWA06300
GO TO 20	SWA06310
89 IF(MD.EQ.2) GO TO 303	SWA06320
A23(K)=AM23*ROM	SWA06330
A33(K)=AM33*ROM	SWA06340
A43(K)=AM43*ROM	SWA06350
B23(K)=BM23*RHO	SWA06360
B33(K)=BM33*RHO	SWA06370
B43(K)=BM43*RHO	SWA06380
778 F3(K)=QF3	SWA06390
H3(K)=QH3	SWA06400
V02(K)=VT2	SWA06410
V04(K)=VT4	SWA06420
V06(K)=VT2	SWA06430
IF(MD.EQ.1) GO TO 20	SWA06440
303 A22(K)=AM22*ROM	SWA06450
A24(K)=AM24*ROM	SWA06460
A32(K)=AM32*ROM	SWA06470
A34(K)=AM34*ROM	SWA06480
A42(K)=AM42*ROM	SWA06490
A44(K)=AM44*ROM	SWA06500
B22(K)=BM22*RHO	SWA06510
B24(K)=BM24*RHO	SWA06520
B32(K)=BM32*RHO	SWA06530
B34(K)=BM34*RHO	SWA06540
B42(K)=BM42*RHO	SWA06550
B44(K)=BM44*RHO	SWA06560
F2(K)=QF2	SWA06570
F4(K)=QF4	SWA06580
H2(K)=QH2	SWA06590
H4(K)=QH4	SWA06600
V03(K)=VT3	SWA06610
V05(K)=VT3	SWA06620
20 CONTINUE	SWA06630
COM	SWA06640
IF(MD.EQ.1.OR.MD.EQ.3) THEN	SWA06650
DO 1278 I=1,NSTA	SWA06660
A33ND=A33(I)/AREAC(I)/1.932	SWA06670
B33ND=B33(I)/AREAC(I)/OMO/1.932	SWA06680
1278 WRITE(2,1279) I,A33(I),A33ND,B33(I),B33ND	SWA06690
1279 FORMAT(' I=',I5,' A33=',E10.4,' A33ND=',E10.4,' B33=',E10.4,' B33NSWA06700	
*D=',E10.4)	SWA06710
ELSEIF (MD.EQ.2.OR.MD.EQ.3) THEN	SWA06720

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HS2=(HS/2.)*2 SWA06730
DO 1281 I=1,NSTA SWA06740
A22ND=A22(I)/AREAC(I)/1.932 SWA06750
B22ND=B22(I)/AREAC(I)/1.932/OMO SWA06760
A44ND=A44(I)/AREAC(I)/1.932/HS2 SWA06770
B44ND=B44(I)/AREAC(I)/1.932/OMO/HS2 SWA06780
1281 WRITE(2,1282) I,A22ND,B22ND,A44ND,B44ND SWA06790
1282 FORMAT(' I=',I5,' A22ND=',E10.4,' B22ND=',E10.4,' A44ND=',E10.4,' SWA06800
* B44ND=',E10.4) SWA06810
ENDIF SWA06820
COM SWA06830
RETURN SWA06840
END SWA06850
SUBROUTINE FREQ(MD,ML) SWA06860
IMPLICIT COMPLEX(Q) SWA06870
COMPLEX CEXP,ZUNIT SWA06880
COMMON/CMFRDB/QDD(6),QL2,QL3,QL4,QFH2,QFH3,QFH4,ZUNIT,XL(31) SWA06890
C, YL(31),ICAT,IXYN SWA06900
COMMON/CAT2D/ X(30),Y(30),XX(30),YY(30),DEL(30),SNE(30),CSE(30) SWA06910
C, FR2(30),FR3(30),FR4(30),BLGH(30,30),BLGS(30,30) SWA06920
C, YLGH(30,30),YLGS(30,30) SWA06930
COMMON/CNST/ NON,NUT,NOE,UN,OMEGA,TP1,DEW,DOG,K,ID,GR,GRS,UNW SWA06940
1, OMEGAW,CBETA,SBETA,XSTA SWA06950
2, AM22,AM23,AM24,AM32,AM33,AM34,AM42,AM43,AM44 SWA06960
3, BM22,BM23,BM24,BM32,BM33,BM34,BM42,BM43,BM44 SWA06970
4, VT2,VT3,VT4,QF2,QF3,QF4,QH2,QH3,QH4 SWA06980
DIMENSION QPOT2(30),QPOT3(30),QPOT4(30) SWA06990
1, PSI1(30,30),PSI2(30,30),PSI3(30,30),PSI4(30,30),C2(60,60) SWA07000
2), C3(60,60),C4(60,60),CN2(60,1),CN3(60,1),CN4(60,1) SWA07010
3, PAH(30),PAS(30),PAR(30),PVH(30),PVS(30),PVR(30) SWA07020
4,D2(60,60),D3(60,60),DN2(60,1),DN3(60,1),QDE(30),QDO(30) SWA07030
QQ=(0.,1.) SWA07040
10 DO 1 I=1,NON SWA07050
NI=NON+I SWA07060
IF(MD.EQ.2) GO TO 301 SWA07070
CN3(I,1)=0.0 SWA07080
CN3(NI,1)=OMEGA*FR3(I) SWA07090
IF(MD.EQ.1) GO TO 302 SWA07100
301 CN2(I,1)=0.0 SWA07110
CN4(I,1)=0.0 SWA07120
CN2(NI,1)=OMEGA*FR2(I) SWA07130
CN4(NI,1)=OMEGA*FR4(I) SWA07140
302 XR1=UN*(XX(I)-X(1)) SWA07150
YR1=-UN*(YY(I)+Y(1)) SWA07160
XL1=UN*(XX(I)+X(1)) SWA07170
YL1=YR1 SWA07180
CALL DAVID(XR1,YR1,EJ1,CXR1,SXR1,RAR1,RBR1,CR1,SR1) SWA07190
CALL DAVID(XL1,YL1,EJ1,CXL1,SXL1,RAL1,RBL1,CL1,SL1) SWA07200
DO 1 J=1,NON SWA07210
NJ=NON+J SWA07220
XR2=UN*(XX(I)-X(J+1)) SWA07230
YR2=-UN*(YY(I)+Y(J+1)) SWA07240
XL2=UN*(XX(I)+X(J+1)) SWA07250
YL2=YR2 SWA07260
CALL DAVID(XR2,YR2,EJ2,CXR2,SXR2,RAR2,RBR2,CR2,SR2) SWA07270
CALL DAVID(XL2,YL2,EJ2,CXL2,SXL2,RAL2,RBL2,CL2,SL2) SWA07280

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SIPJ=SNE(I)*CSE(J)+SNE(J)*CSE(I)	SWA07290
CIPJ=CSE(I)*CSE(J)-SNE(I)*SNE(J)	SWA07300
SIMJ=SNE(I)*CSE(J)-SNE(J)*CSE(I)	SWA07310
CIMJ=CSE(I)*CSE(J)+SNE(I)*SNE(J)	SWA07320
ABC1=2.*(SIPJ*(CR1-CR2)-CIPJ*(SR1-SR2))	SWA07330
ABC2=2.*(SIMJ*(CL1-CL2)-CIMJ*(SL1-SL2))	SWA07340
ABC3=2./UN*(SNE(J)*(RAR1-RAR2)+CSE(J)*(RBR1-RBR2))	SWA07350
ABC4=2./UN*(SNE(J)*(RAL1-RAL2)+CSE(J)*(RBL2-RBL1))	SWA07360
ABC5= EJ2*(SXR2*CIPJ-CXR2*SIPJ)-EJ1*(SXR1*CIPJ-CXR1*SIPJ)	SWA07370
ABC6= EJ2*(SXL2*CIMJ-CXL2*SIMJ)-EJ1*(SXL1*CIMJ-CXL1*SIMJ)	SWA07380
ABC7=(EJ1*(SXR1*CSE(J)-CXR1*SNE(J))-EJ2*(SXR2*CSE(J)-CXR2*SNE(J)))	SWA07390
C /UN	SWA07400
ABC8=(EJ1*(SXL1*CSE(J)+CXL1*SNE(J))-EJ2*(SXL2*CSE(J)+CXL2*SNE(J)))	SWA07410
C /UN	SWA07420
IF(MD.EQ.2) GO TO 303	SWA07430
C3(I,J)=(BLGH(I,J)+ABC1-ABC2)/TPI	SWA07440
PSI1(I,J)=(YLGH(I,J)+ABC3+ABC4)/TPI	SWA07450
C3(NI,NJ)=C3(I,J)	SWA07460
C3(I,NJ)= ABC5-ABC6	SWA07470
PSI2(I,J)= ABC7-ABC8	SWA07480
C3(NI,J)=-C3(I,NJ)	SWA07490
IF(MD.EQ.1) GO TO 304	SWA07500
303 C2(I,J)=(BLGS(I,J)+ABC1+ABC2)/TPI	SWA07510
C4(I,J)=C2(I,J)	SWA07520
PSI3(I,J)=(YLGS(I,J)+ABC3-ABC4)/TPI	SWA07530
C2(NI,NJ)=C2(I,J)	SWA07540
C4(NI,NJ)=C2(NI,NJ)	SWA07550
C2(I,NJ)= ABC5+ABC6	SWA07560
C4(I,NJ)=C2(I,NJ)	SWA07570
PSI4(I,J)= ABC7+ABC8	SWA07580
C2(NI,J)=-C2(I,NJ)	SWA07590
C4(NI,J)=C2(NI,J)	SWA07600
304 IF(J-NON)7,1,1	SWA07610
7 XR1=XR2	SWA07620
YR1=YR2	SWA07630
XL1=XL2	SWA07640
YL1=YL2	SWA07650
EJ1=EJ2	SWA07660
CR1=CR2	SWA07670
SR1=SR2	SWA07680
CL1=CL2	SWA07690
SL1=SL2	SWA07700
RAR1=RAR2	SWA07710
RBR1=RBR2	SWA07720
RAL1=RAL2	SWA07730
RBL1=RBL2	SWA07740
CXR1=CXR2	SWA07750
SXR1=SXR2	SWA07760
CXL1=CXL2	SWA07770
SXL1=SXL2	SWA07780
1 CONTINUE	SWA07790
ICK=0	SWA07800
IF(ICAT.EQ.1.AND.K.EQ.IXYN) ICK=1	SWA07810
IF(ICK.EQ.0) GOTO 778	SWA07820
DO 777 I=1,NOE	SWA07830
DO 777 J=1,NOE	SWA07840



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D2(I,J)=C2(I,J)
777 D3(I,J)=C3(I,J)
C
778 IF(MD.EQ.2) GO TO 305
    CALL MATINV(C3,NOE,CN3,1,DOG, ID)
    GO TO (21,6),ID
21 DO 22 I=1,NON
    PAH(I)=0.0
    PVH(I)=0.0
    DO 23 J=1,NON
    NJ=NON+J
    PAH(I)=PAH(I)+CN3(J,1)*PSI2(I,J)-CN3(NJ,1)*PSI1(I,J)
23 PVH(I)=PVH(I)+CN3(J,1)*PSI1(I,J)+CN3(NJ,1)*PSI2(I,J)
    QPOT3(I)=(PVH(I)+QQ*PAH(I))*GRS
    PAH(I)=OMEGA*PAH(I)
22 PVH(I)=OMEGA*PVH(I)
C
CC
C    PRINTOUT OF SOURCE STRENGTH AND PRESSURE ON THE HULL
C
C    WRITE(2,1961)
C1961  FORMAT(' ORDER      QC      QS')
C    DO 1960 J=1,NON
C    NJ=J+NON
C1960  WRITE(2,1962) J,CN3(J,1),CN3(NJ,1)
C1962  FORMAT(1X,I5,2(2X,E10.4))
C
C    WRITE(2,1958)
C1958  FORMAT(' ORDER      PAH      PVH')
C    DO 1959 J=1,NON
C1959  WRITE(2,1962) J,PAH(J),PVH(J)
C
CC
    QAB33=(0.,0.)
    QAB23=(0.,0.)
    QAB43=(0.,0.)
    DO 31 I=1,NON
    QAB33=QAB33+QPOT3(I)*FR3(I)*DEL(I)
    QAB23=QAB23+QPOT3(I)*FR2(I)*DEL(I)
31 QAB43=QAB43+QPOT3(I)*FR4(I)*DEL(I)
    AM33=AIMAG(QAB33)*2.0
    BM33= REAL(QAB33)*2.0
    AM23=AIMAG(QAB23)
    BM23= REAL(QAB23)
    AM43=AIMAG(QAB43)
    BM43= REAL(QAB43)
C
    IF(MD.EQ.1) GO TO 306
305 CALL MATINV(C2,NOE,CN2,1,DOG, ID)
    GO TO (27,6),ID
27 CALL MATINV(C4,NOE,CN4,1,DOG, ID)
    GO TO (24,6),ID
24 DO 25 I=1,NON
    PAS(I)=0.0
    PVS(I)=0.0
    PAR(I)=0.0

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SWA07850
SWA07860
SWA07870
SWA07880
SWA07890
SWA07900
SWA07910
SWA07920
SWA07930
SWA07940
SWA07950
SWA07960
SWA07970
SWA07980
SWA07990
SWA08000
SWA08010
SWA08020
SWA08030
SWA08040
SWA08050
SWA08060
SWA08070
SWA08080
SWA08090
SWA08100
SWA08110
SWA08120
SWA08130
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SWA08220
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SWA08270
SWA08280
SWA08290
SWA08300
SWA08310
SWA08320
SWA08330
SWA08340
SWA08350
SWA08360
SWA08370
SWA08380
SWA08390
SWA08400

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PVR(I)=0.0 SWA08410
DO 26 J=1,NON SWA08420
NJ=NON+J SWA08430
PAS(I)=PAS(I)+CN2(J,1)*PSI4(I,J)-CN2(NJ,1)*PSI3(I,J) SWA08440
PVS(I)=PVS(I)+CN2(J,1)*PSI3(I,J)+CN2(NJ,1)*PSI4(I,J) SWA08450
PAR(I)=PAR(I)+CN4(J,1)*PSI4(I,J)-CN4(NJ,1)*PSI3(I,J) SWA08460
26 PVR(I)=PVR(I)+CN4(J,1)*PSI3(I,J)+CN4(NJ,1)*PSI4(I,J) SWA08470
QPOT2(I)=(PVS(I)+QQ*PAS(I))*GRS SWA08480
QPOT4(I)=(PVR(I)+QQ*PAR(I))*GRS SWA08490
PAS(I)=OMEGA*PAS(I) SWA08500
PVS(I)=OMEGA*PVS(I) SWA08510
PAR(I)=OMEGA*PAR(I) SWA08520
25 PVR(I)=OMEGA*PVR(I) SWA08530
C SWA08540
QAB22=(0.,0.) SWA08550
QAB42=(0.,0.) SWA08560
QAB24=(0.,0.) SWA08570
QAB32=(0.,0.) SWA08580
QAB34=(0.,0.) SWA08590
QAB44=(0.,0.) SWA08600
DO 37 I=1,NON SWA08610
QAB22=QAB22+QPOT2(I)*FR2(I)*DEL(I) SWA08620
QAB42=QAB42+QPOT2(I)*FR4(I)*DEL(I) SWA08630
QAB24=QAB24+QPOT4(I)*FR2(I)*DEL(I) SWA08640
QAB32=QAB32+QPOT2(I)*FR3(I)*DEL(I) SWA08650
QAB34=QAB34+QPOT4(I)*FR3(I)*DEL(I) SWA08660
37 QAB44=QAB44+QPOT4(I)*FR4(I)*DEL(I) SWA08670
AM22=AIMAG(QAB22)*2.0 SWA08680
BM22= REAL(QAB22)*2.0 SWA08690
AM42=AIMAG(QAB42)*2.0 SWA08700
BM42= REAL(QAB42)*2.0 SWA08710
AM24=AIMAG(QAB24)*2.0 SWA08720
BM24= REAL(QAB24)*2.0 SWA08730
AM44=AIMAG(QAB44)*2.0 SWA08740
BM44= REAL(QAB44)*2.0 SWA08750
AM32=AIMAG(QAB32) SWA08760
BM32= REAL(QAB32) SWA08770
AM34=AIMAG(QAB34) SWA08780
BM34= REAL(QAB34) SWA08790
C SWA08800
306 QF2=(0.,0.) SWA08810
QF3=(0.,0.) SWA08820
QF4=(0.,0.) SWA08830
QH2=(0.,0.) SWA08840
QH3=(0.,0.) SWA08850
QH4=(0.,0.) SWA08860
VT2=0.0 SWA08870
VT3=0.0 SWA08880
VT4=0.0 SWA08890
DO 32 I=1,NON SWA08900
E1=EXP(UNW*YY(I))*DEL(I) SWA08910
S1=UNW*XX(I)*SBETA SWA08920
CKYSB=COS(S1) SWA08930
SKYSB=SIN(S1) SWA08940
EZ=E1/DEL(I)*OMEGA SWA08950
NI=NON+I SWA08960

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DN2(I,1)=0.0 SWA08970
DN3(NI,1)=0.0 SWA08980
DN2(NI,1)=-EZ*(FR2(I)*CKYSB+FR3(I)*SKYSB) SWA08990
DN3(I,1)=EZ*(FR2(I)*SKYSB-FR3(I)*CKYSB) SWA09000
CYZL=CKYSB*E1 SWA09010
SYZL=SKYSB*E1 SWA09020
SSYZL=SYZL*SNE(I) SWA09030
IF(MD.EQ.2) GO TO 33 SWA09040
CCYZL=CYZL*CSE(I) SWA09050
QF3 =QF3 +CCYZL SWA09060
QH3 =QH3 +QQ*QPOT3(I)*(CCYZL+SSYZL*SBETA) SWA09070
IF(MD.EQ.1) GO TO 34 SWA09080
33 SCYZL=-SNE(I)*CYZL SWA09090
CSYZL= CSE(I)*SYZL SWA09100
SBPC=SCYZL*SBETA+CSYZL SWA09110
QF2=QF2-QQ*SSYZL SWA09120
QF4=QF4+QQ*FR4(I)*SYZL SWA09130
QH2=QH2-SBPC*QPOT2(I) SWA09140
QH4=QH4-SBPC*QPOT4(I) SWA09150
34 IF(ML.EQ.0) GO TO 32 SWA09160
IF(MD.EQ.2) GO TO 35 SWA09170
VT2=VT2-SNE(I)*CYZL SWA09180
VT4=VT4+FR4(I)*CYZL SWA09190
IF(MD.EQ.1) GO TO 32 SWA09200
35 VT3=VT3+CSYZL SWA09210
32 CONTINUE SWA09220
Q5=-QQ*UNW*XSTA *CBETA SWA09230
Q5=CEXP(Q5)*2.0 SWA09240
Q6=Q5*GR SWA09250
Q7=Q5*OMEGAW SWA09260
QF2=QF2*Q6 SWA09270
QF3=QF3*Q6 SWA09280
QF4=QF4*Q6 SWA09290
QH2=QH2*Q7 SWA09300
QH3=QH3*Q7 SWA09310
QH4=QH4*Q7 SWA09320
IF(ICK.EQ.0) GOTO 6 SWA09330
QFH2=QF2+QH2 SWA09340
QFH3=QF3+QH3 SWA09350
QFH4=QF4+QH4 SWA09360
CALL MATINV(D2,NOE, DN2,1,DOG, ID) SWA09370
CALL MATINV(D3,NOE, DN3,1,DOG, ID) SWA09380
DO 41 I=1,NON SWA09390
PAS(I)=0.0 SWA09400
PVS(I)=0.0 SWA09410
PAH(I)=0.0 SWA09420
PVH(I)=0.0 SWA09430
DO 42 J=1,NON SWA09440
NJ=NON+J SWA09450
PAH(I)=PAH(I)+DN3(J,1)*PSI2(I,J)-DN3(NJ,1)*PSI1(I,J) SWA09460
PVH(I)=PVH(I)+DN3(J,1)*PSI1(I,J)+DN3(NJ,1)*PSI2(I,J) SWA09470
PAS(I)=PAS(I)+DN2(J,1)*PSI4(I,J)-DN2(NJ,1)*PSI3(I,J) SWA09480
42 PVS(I)=PVS(I)+DN2(J,1)*PSI3(I,J)+DN2(NJ,1)*PSI4(I,J) SWA09490
QDE(I)=(PVH(I)+QQ*PAH(I))*GRS*(-QQ) SWA09500
41 QDO(I)=(PVS(I)+QQ*PAS(I))*GRS*QQ SWA09510
QRW=-OMEGAW*QQ SWA09520

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QTR=2.0*QRW	SWA09530
QD2=(0.,0.)	SWA09540
QD3=(0.,0.)	SWA09550
QD4=(0.,0.)	SWA09560
QL2=(0.,0.)	SWA09570
QL3=(0.,0.)	SWA09580
QL4=(0.,0.)	SWA09590
DO 43 I=1,NON	SWA09600
QD2=QD2+QDO(I)*FR2(I)*DEL(I)	SWA09610
QD4=QD4+QDO(I)*FR4(I)*DEL(I)	SWA09620
QD3=QD3+QDE(I)*FR3(I)*DEL(I)	SWA09630
QL2=QL2+QDE(I)*FR2(I)*DEL(I)	SWA09640
QL4=QL4+QDE(I)*FR4(I)*DEL(I)	SWA09650
43 QL3=QL3+QDO(I)*FR3(I)*DEL(I)	SWA09660
QD2=QD2*QTR	SWA09670
QD3=QD3*QTR	SWA09680
QD4=QD4*QTR	SWA09690
QL2=QL2*QRW	SWA09700
QL3=QL3*QRW	SWA09710
QL4=QL4*QRW	SWA09720
6 RETURN	SWA09730
END	SWA09740
SUBROUTINE DYLOAD(VLOAD,ETA,A,B,XI,DX,CBET,RHO,GRAV,NSTA,NSP,OM	SWA09750
C, MD,ZCG)	SWA09760
IMPLICIT COMPLEX(Q)	SWA09770
COMPLEX VLOAD(6),ETA(6),ZUNIT	SWA09780
COMMON/CMFRDB/QDD(6),QL2,QL3,QL4,QFH2,QFH3,QFH4,ZUNIT,XL(31)	SWA09790
C, YL(31),ICAT,IXYN	SWA09800
COMMON/DYOD/V02(27),V03(27),V04(27),V05(27),V06(27)	SWA09810
C ,BET,XCGP,YCGP,ZCGP,YBP,C33,C35,GMASS,WN ,ZETAA,ZDECK	SWA09820
DIMENSION VDA(27),VDB(27),VDC(27),A(6,6),B(6,6),XI(27),DX(26)	SWA09830
C, VDE(27),VDF(27)	SWA09840
Q=(0.,1.)	SWA09850
VLOAD(1)=(0.,0.)	SWA09860
DMN=GMASS*GRAV	SWA09870
GMASH=GMASS*0.5	SWA09880
CH3=C33*0.5	SWA09890
CH5=C35*0.5	SWA09900
OM2=OM*OM	SWA09910
DO 10 I=1,NSTA	SWA09920
WA=WN*XI(I)*CBET	SWA09930
WAC=COS(WA)	SWA09940
WAS=SIN(WA)	SWA09950
IF(MD.EQ.2) GO TO 40	SWA09960
VDA(I)=WAC*V02(I)	SWA09970
VO2(I)=WAS*V02(I)	SWA09980
VDB(I)=WAC*V04(I)	SWA09990
VO4(I)=WAS*V04(I)	SWA10000
VDC(I)=VDA(I)*XI(I)	SWA10010
VO6(I)=VO2(I)*XI(I)	SWA10020
IF(MD.EQ.1) GO TO 10	SWA10030
40 VDE(I)=WAC*V03(I)	SWA10040
VO3(I)=WAS*V03(I)	SWA10050
VDF(I)=VDE(I)*XI(I)	SWA10060
VO5(I)=VO3(I)*XI(I)	SWA10070
10 CONTINUE	SWA10080

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IF(MD.EQ.2) GO TO 50
WC2=TRAP(DX,VDA,NSTA,NSP)
WS2=TRAP(DX,VO2,NSTA,NSP)
WC4=TRAP(DX,VDB,NSTA,NSP)
WS4=TRAP(DX,VO4,NSTA,NSP)
WC6=TRAP(DX,VDC,NSTA,NSP)
WS6=TRAP(DX,VO6,NSTA,NSP)
C
101 VLOAD(2)=ETA(3)*(Q*OM*B(2,3)-OM2*A(2,3))+ETA(5)*(Q*OM*B(2,5)-OM2*
CA(2,5))-RHO*GRAV*ZETAA*(WC2-Q*WS2)-RHO*QDD(2)
VLOAD(4)=ETA(3)*(YBP*CH3+Q*OM*B(4,3)-OM2*(A(4,3)+GMASH*YCGP))
C+ETA(5)*(YBP*CH5+Q*OM*B(4,5)-OM2*(A(4,5)-YCGP*XCGP*GMASH))-RHO
C*GRAV*ZETAA*(WC4-Q*WS4)-RHO*QDD(4)
VLOAD(6)=ETA(3)*(Q*OM*B(6,3)-OM2*A(6,3))+ETA(5)*(Q*OM*B(6,5)
C-OM2*A(6,5))-RHO*GRAV*ZETAA*(WC6-Q*WS6)-RHO*QDD(6)
C
IF(MD.EQ.1) GO TO 30
50 WC3=TRAP(DX,VDE,NSTA,NSP)
WS3=TRAP(DX,VO3,NSTA,NSP)
WC5=TRAP(DX,VDF,NSTA,NSP)
WS5=TRAP(DX,VO5,NSTA,NSP)
VLOAD(3)=ETA(2)*(Q*OM*B(3,2)-OM2*A(3,2))+ETA(4)*(YBP*CH3+Q*OM
C*B(3,4)-OM2*(A(3,4)+GMASH*YCGP))+ETA(6)*(Q*OM*B(3,6)-OM2*A(3,6))
C-Q*RHO*GRAV*ZETAA*(WC3-Q*WS3)-RHO*QDD(3)
VLOAD(5)=ETA(2)*(Q*OM*B(5,2)-OM2*A(5,2))+ETA(4)*(YBP*CH5+Q*OM
C*B(5,4)-OM2*(A(5,4)-YCGP*XCGP*GMASH))+ETA(6)*(Q*OM*B(5,6)-OM2
C*(A(5,6)-YCGP*XCGP*GMASH))+Q*RHO*GRAV*ZETAA*(WC5-Q*WS5)+RHO*QDD(5)
VLOAD(2)=VLOAD(2)+OM2*GMASH*((ZCGP-ZCG)*ETA(4)-XCGP*ETA(6))
VLOAD(4)=VLOAD(4)+OM2*GMASH*((ZCGP-ZCG)*ETA(2)+XCGP*XCGP*ETA(6))
VLOAD(4)=VLOAD(4)+ZDECK*VLOAD(2)
VLOAD(6)=VLOAD(6)+OM2*GMASH*(XCGP*XCGP*ETA(4)+YCGP*XCGP*ETA(5)
C-XCGP*ETA(2))
VLOAD(3)=VLOAD(3)+OM2*GMASH*XCGP*ETA(5)
VLOAD(5)=VLOAD(5)+OM2*GMASH*XCGP*ETA(3)
30 RETURN
END
SUBROUTINE ABSUPH(A,B,A23,B23,A43,B43,XI,DX,NSTA,NSP)
DIMENSION A(6,6),B(6,6),A23(27),B23(27),A43(27),B43(27),XI(27)
C,DX(26)
DIMENSION XA2(27),XB2(27),XA4(27),XB4(27)
A(2,3)=TRAP(DX,A23,NSTA,NSP)
B(2,3)=TRAP(DX,B23,NSTA,NSP)
A(4,3)=TRAP(DX,A43,NSTA,NSP)
B(4,3)=TRAP(DX,B43,NSTA,NSP)
DO 10 I=1,NSTA
XA2(I)=XI(I)*A23(I)
XB2(I)=XI(I)*B23(I)
XA4(I)=XI(I)*A43(I)*(-1.)
10 XB4(I)=XI(I)*B43(I)*(-1.)
A(6,3)=TRAP(DX,XA2,NSTA,NSP)
B(6,3)=TRAP(DX,XB2,NSTA,NSP)
A(4,5)=TRAP(DX,XA4,NSTA,NSP)
B(4,5)=TRAP(DX,XB4,NSTA,NSP)
DO 20 I=1,NSTA
XA2(I)=XI(I)*XA2(I)*(-1.)
20 XB2(I)=XI(I)*XB2(I)*(-1.)

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A(6,5)=TRAP(DX,XA2,NSTA,NSP) SWA10650
B(6,5)=TRAP(DX,XB2,NSTA,NSP) SWA10660
A(2,5)=A(6,3)*(-1.) SWA10670
B(2,5)=B(6,3)*(-1.) SWA10680
RETURN SWA10690
END SWA10700
SUBROUTINE ABSWRY(A,B,A32,B32,A34,B34,XI,DX,NSTA,NSP) SWA10710
DIMENSION A(6,6),B(6,6),A32(27),B32(27),A34(27),B34(27),XI(27) SWA10720
C,DX(26) SWA10730
DIMENSION XA2(27),XB2(27),XA4(27),XB4(27) SWA10740
A(3,2)=TRAP(DX,A32,NSTA,NSP) SWA10750
B(3,2)=TRAP(DX,B32,NSTA,NSP) SWA10760
A(3,4)=TRAP(DX,A34,NSTA,NSP) SWA10770
B(3,4)=TRAP(DX,B34,NSTA,NSP) SWA10780
DO 10 I=1,NSTA SWA10790
XA2(I)=XI(I)*A32(I) SWA10800
XB2(I)=XI(I)*B32(I) SWA10810
XA4(I)=XI(I)*A34(I)*(-1.) SWA10820
10 XB4(I)=XI(I)*B34(I)*(-1.) SWA10830
A(3,6)=TRAP(DX,XA2,NSTA,NSP) SWA10840
B(3,6)=TRAP(DX,XB2,NSTA,NSP) SWA10850
A(5,4)=TRAP(DX,XA4,NSTA,NSP) SWA10860
B(5,4)=TRAP(DX,XB4,NSTA,NSP) SWA10870
DO 20 I=1,NSTA SWA10880
XA2(I)=XI(I)*XA2(I)*(-1.) SWA10890
20 XB2(I)=XI(I)*XB2(I)*(-1.) SWA10900
A(5,6)=TRAP(DX,XA2,NSTA,NSP) SWA10910
B(5,6)=TRAP(DX,XB2,NSTA,NSP) SWA10920
A(5,2)=A(3,6)*(-1.) SWA10930
B(5,2)=B(3,6)*(-1.) SWA10940
RETURN SWA10950
END SWA10960
SUBROUTINE SPCTRM(GRAV,NW,NSP,NROMS,MD,ML,V,LS,LL,BAT) SWA10970
COMMON/SCREST/RSE2(10,10),RSE3(10,10),RSE4(10,10),RSE5(10,10), SWA10980
CRSE6(10,10),RSV2(10,10),RSV3(10,10),RSV4(10,10),RSV5(10,10), SWA10990
CRSV6(10,10),ALPHA(10),ZETA13(10),OMP(10) SWA11000
COMMON/SPTM/OMEGAM(30),OMEGA(30),OMEGAE(30),ESPC1(30), SWA11010
CESPC2(30),ESPC3(30),ESPC4(30),ESPC5(30),ESPC6(30),VSPC1(30), SWA11020
CVSPC2(30),VSPC3(30),VSPC4(30),VSPC5(30),VSPC6(30) SWA11030
DIMENSION SPCSW(30,10),DXW(29),E1(30),E2(30),E3(30),E4(30),E5(30) SWA11040
C,E6(30),V1(30),V2(30),V3(30),V4(30),V5(30),V6(30),SPCWW(30,10) SWA11050
GR=GRAV SWA11060
NRS=NROMS-1 SWA11070
IF(LL.GE.2) GO TO 21 SWA11080
DO 1 I=1,NW SWA11090
ZT13=ZETA13(I) SWA11100
OMPW=OMP(I) SWA11110
IF(OMPW.LE.0.001) GO TO 2 SWA11120
OMPW4=OMPW*OMPW SWA11130
OMPW4=OMPW4*OMPW4 SWA11140
OMPW5=OMPW4*OMPW SWA11150
ALPA=0.3125*OMPW4*ZT13*ZT13 SWA11160
BETA=1.25*OMPW4 SWA11170
GO TO 3 SWA11180
2 ALPA=0.0081*GR*GR SWA11190
BETA=4.0*ALPA/ZT13/ZT13 SWA11200

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3 DO 4 J=1,NROMS	SWA11210
OM4=OMEGA(J)*OMEGA(J)	SWA11220
OM4=OM4*OM4	SWA11230
OM5=OM4*OMEGA(J)	SWA11240
CHCK=-BETA/OM4	SWA11250
IF(CHCK.LT.-50. ) SPCWW(J,I)=0.0	SWA11260
4 IF(CHCK.GE.-50. ) SPCWW(J,I)=ALPA/OM5*EXP(CHCK)	SWA11270
1 CONTINUE	SWA11280
21 IF(LS.EQ.0) GO TO 29	SWA11290
AL=ALPHA(LL)/57.29578	SWA11300
CALS=COS(AL)	SWA11310
CALS=CALS*CALS	SWA11320
29 DO 30 I=1,NW	SWA11330
DO 30 J=1,NROMS	SWA11340
SPCSW(J,I)=SPCWW(J,I)	SWA11350
IF(LS.EQ.0) GO TO 30	SWA11360
SPCSW(J,I)=CALS*SPCWW(J,I)*2.0/3.14159	SWA11370
30 CONTINUE	SWA11380
DO 10 I=1,NRS	SWA11390
10 DXW(I)=OMEGA(I+1)-OMEGA(I)	SWA11400
DO 11 J=1,NROMS	SWA11410
IF(MD.EQ.2) GO TO 12	SWA11420
ESPC3(J)=ESPC3(J)*ESPC3(J)	SWA11430
ESPC5(J)=ESPC5(J)*ESPC5(J)	SWA11440
IF(V.GT.0.001) GO TO 13	SWA11450
IF(ML.EQ.0) GO TO 13	SWA11460
VSPC2(J)=VSPC2(J)*VSPC2(J)	SWA11470
VSPC4(J)=VSPC4(J)*VSPC4(J)	SWA11480
VSPC6(J)=VSPC6(J)*VSPC6(J)	SWA11490
13 IF(MD.EQ.1) GO TO 11	SWA11500
12 ESPC2(J)=ESPC2(J)*ESPC2(J)	SWA11510
ESPC4(J)=ESPC4(J)*ESPC4(J)	SWA11520
ESPC6(J)=ESPC6(J)*ESPC6(J)	SWA11530
IF(V.GT.0.001) GO TO 11	SWA11540
IF(ML.EQ.0) GO TO 11	SWA11550
VSPC3(J)=VSPC3(J)*VSPC3(J)	SWA11560
VSPC5(J)=VSPC5(J)*VSPC5(J)	SWA11570
11 CONTINUE	SWA11580
IF(LS.EQ.0) WRITE(2,3001) V,BAT	SWA11590
DO 5 I=1,NW	SWA11600
ZT13=ZETA13(I)	SWA11610
OMPW=OMP(I)	SWA11620
OP=OMPW	SWA11630
IF(OP.GT.0.001) GO TO 71	SWA11640
OMPW=0.4013*SQRT(GRAV/ZT13)	SWA11650
71 IF(LS.EQ.0) GO TO 72	SWA11660
GO TO 73	SWA11670
72 IF(OP.GT.0.001) WRITE(2,3015)	SWA11680
IF(OP.LE.0.001) WRITE(2,3016)	SWA11690
WRITE(2,3002) I,ZT13,OMPW	SWA11700
73 DO 6 J=1,NROMS	SWA11710
A=SPCSW(J,I)	SWA11720
IF(MD.EQ.2) GO TO 7	SWA11730
E3(J)=ESPC3(J)*A	SWA11740
E5(J)=ESPC5(J)*A	SWA11750
IF(V.GT.0.001) GO TO 14	SWA11760

IF(ML.EQ.0) GO TO 14	SWA11770
V2(J)=VSPC2(J)*A	SWA11780
V4(J)=VSPC4(J)*A	SWA11790
V6(J)=VSPC6(J)*A	SWA11800
14 IF(MD.EQ.1) GO TO 6	SWA11810
7 E2(J)=ESPC2(J)*A	SWA11820
E4(J)=ESPC4(J)*A	SWA11830
E6(J)=ESPC6(J)*A	SWA11840
IF(V.GT.0.001) GO TO 6	SWA11850
IF(ML.EQ.0) GO TO 6	SWA11860
V3(J)=VSPC3(J)*A	SWA11870
V5(J)=VSPC5(J)*A	SWA11880
6 CONTINUE	SWA11890
IF(MD.EQ.2) GO TO 8	SWA11900
RMSE3=TRAP(DXW,E3,NROMS,NSP)	SWA11910
RMSE5=TRAP(DXW,E5,NROMS,NSP)	SWA11920
IF(LS.EQ.0) GO TO 22	SWA11930
RSE3(LL,I)=RMSE3	SWA11940
RSE5(LL,I)=RMSE5	SWA11950
GO TO 23	SWA11960
22 RMSE3=SQRT(RMSE3)	SWA11970
RMSE5=SQRT(RMSE5)	SWA11980
HMSE3=RMSE3*1.4142	SWA11990
HMSE5=RMSE5*1.4142	SWA12000
H13E3=RMSE3*2.0	SWA12010
H13E5=RMSE5*2.0	SWA12020
H10E3=RMSE3*3.95	SWA12030
H10E5=RMSE5*3.95	SWA12040
WRITE(2,3003)	SWA12050
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),ESPC3(K),E3(K),OMEGAE(K),K=1,	SWA12060
CNROMS)	SWA12070
WRITE(2,3005) RMSE3,HMSE3,H13E3,H10E3	SWA12080
WRITE(2,3006)	SWA12090
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),ESPC5(K),E5(K),OMEGAE(K),K=1,	SWA12100
CNROMS)	SWA12110
WRITE(2,3005) RMSE5,HMSE5,H13E5,H10E5	SWA12120
23 IF(V.GT.0.001) GO TO 15	SWA12130
IF(ML.EQ.0) GO TO 15	SWA12140
RMSV2=TRAP(DXW,V2,NROMS,NSP)	SWA12150
RMSV4=TRAP(DXW,V4,NROMS,NSP)	SWA12160
RMSV6=TRAP(DXW,V6,NROMS,NSP)	SWA12170
IF(LS.EQ.0) GO TO 24	SWA12180
RSV2(LL,I)=RMSV2	SWA12190
RSV4(LL,I)=RMSV4	SWA12200
RSV6(LL,I)=RMSV6	SWA12210
GO TO 25	SWA12220
24 RMSV2=SQRT(RMSV2)	SWA12230
RMSV4=SQRT(RMSV4)	SWA12240
RMSV6=SQRT(RMSV6)	SWA12250
HMSV2=RMSV2*1.4142	SWA12260
HMSV4=RMSV4*1.4142	SWA12270
HMSV6=RMSV6*1.4142	SWA12280
H13V2=RMSV2*2.0	SWA12290
H13V4=RMSV4*2.0	SWA12300
H13V6=RMSV6*2.0	SWA12310
H10V2=RMSV2*3.95	SWA12320



H10V4=RMSV4*3.95	SWA12330
H10V6=RMSV6*3.95	SWA12340
WRITE(2,3007)	SWA12350
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),VSPC2(K),V2(K),OMEGAE(K),K=1, CNROMS)	SWA12360
WRITE(2,3005) RMSV2,HMSV2,H13V2,H10V2	SWA12370
WRITE(2,3008)	SWA12380
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),VSPC4(K),V4(K),OMEGAE(K),K=1, CNROMS)	SWA12390
WRITE(2,3005) RMSV4,HMSV4,H13V4,H10V4	SWA12400
WRITE(2,3009)	SWA12410
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),VSPC6(K),V6(K),OMEGAE(K),K=1, CNROMS)	SWA12420
WRITE(2,3005) RMSV6,HMSV6,H13V6,H10V6	SWA12430
25 CONTINUE	SWA12440
15 IF(MD.EQ.1) GO TO 5	SWA12450
8 RMSE2=TRAP(DXW,E2,NROMS,NSP)	SWA12460
RMSE4=TRAP(DXW,E4,NROMS,NSP)	SWA12470
RMSE6=TRAP(DXW,E6,NROMS,NSP)	SWA12480
IF(LS.EQ.0) GO TO 26	SWA12490
RSE2(LL,I)=RMSE2	SWA12500
RSE4(LL,I)=RMSE4	SWA12510
RSE6(LL,I)=RMSE6	SWA12520
GO TO 27	SWA12530
26 RMSE2=SQRT(RMSE2)	SWA12540
RMSE4=SQRT(RMSE4)	SWA12550
RMSE6=SQRT(RMSE6)	SWA12560
HMSE2=RMSE2*1.4142	SWA12570
HMSE4=RMSE4*1.4142	SWA12580
HMSE6=RMSE6*1.4142	SWA12590
H13E2=RMSE2*2.0	SWA12600
H13E4=RMSE4*2.0	SWA12610
H13E6=RMSE6*2.0	SWA12620
H10E2=RMSE2*3.95	SWA12630
H10E4=RMSE4*3.95	SWA12640
H10E6=RMSE6*3.95	SWA12650
WRITE(2,3010)	SWA12660
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),ESPC2(K),E2(K),OMEGAE(K),K=1, CNROMS)	SWA12670
WRITE(2,3005) RMSE2,HMSE2,H13E2,H10E2	SWA12680
WRITE(2,3011)	SWA12690
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),ESPC4(K),E4(K),OMEGAE(K),K=1, CNROMS)	SWA12700
WRITE(2,3005) RMSE4,HMSE4,H13E4,H10E4	SWA12710
WRITE(2,3012)	SWA12720
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),ESPC6(K),E6(K),OMEGAE(K),K=1, CNROMS)	SWA12730
WRITE(2,3005) RMSE6,HMSE6,H13E6,H10E6	SWA12740
27 IF(V.GT.0.001) GO TO 5	SWA12750
IF(ML.EQ.0) GO TO 5	SWA12760
RMSV3=TRAP(DXW,V3,NROMS,NSP)	SWA12770
RMSV5=TRAP(DXW,V5,NROMS,NSP)	SWA12780
IF(LS.EQ.0) GO TO 28	SWA12790
RSV3(LL,I)=RMSV3	SWA12800
RSV5(LL,I)=RMSV5	SWA12810
GO TO 5	SWA12820
	SWA12830
	SWA12840
	SWA12850
	SWA12860
	SWA12870
	SWA12880

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28 RMSV3=SQRT(RMSV3) SWA12890
RMSV5=SQRT(RMSV5) SWA12900
HMSV3=RMSV3*1.4142 SWA12910
HMSV5=RMSV5*1.4142 SWA12920
H13V3=RMSV3*2.0 SWA12930
H13V5=RMSV5*2.0 SWA12940
H10V3=RMSV3*3.95 SWA12950
H10V5=RMSV5*3.95 SWA12960
WRITE(2,3013) SWA12970
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),VSPC3(K),V3(K),OMEGAE(K),K=1, SWA12980
CNROMS) SWA12990
WRITE(2,3005) RMSV3,HMSV3,H13V3,H10V3 SWA13000
WRITE(2,3014) SWA13010
WRITE(2,3004) (OMEGA(K),SPCSW(K,I),VSPC5(K),V5(K),OMEGAE(K),K=1, SWA13020
CNROMS) SWA13030
WRITE(2,3005) RMSV5,HMSV5,H13V5,H10V5 SWA13040
5 CONTINUE SWA13050
3001 FORMAT(////1X,'IRREGULAR SEA-WAY RESPONSES :'/1X,'LONG CRESTED SEASWA13060
1-WAY'/1X,'SHIP SPEED (FT/SEC) =',F10.5/1X,'WAVE HEADING ANGLE (DEGSWA13070
2REE) =',F10.5/1X,'SEA SPECTRUM ; PIERSON-MOSKOWITZ SPECTRUM FOR FUSWA13080
3LLY DEVELOPED SEA'/16X,'OTHERWISE BRETSCHNEIDER SEA SPECTRUM'////) SWA13090
3002 FORMAT(5X, 'NUMBER OF SEA SPECTRUM = ',12/5X,'SIGNIFICANT WAVE HEISWA13100
1GHT(H1/3) (FT) =',F10.5/5X,'PEAK WAVE FREQ.OF THE SPECTRUM (RAD/SEC)SWA13110
2 =',F10.5 //T11,'WASWA13120
3VE FREQ.',T26,'SPECTRAL DENSITY',T46,'R.A.O.',T66,'SPETRAL DENSITYSWA13130
4',T100,'WAVE FREQ.OF'/T11,' (RAD/SEC)',T26,'OF SEA-WAY',T46,' ((FT,RSWA13140
5AD,TON,TON*',T66,'OF RESPONSE',T100,'ENCOUNTER'/T26,' (FT**2*SEC)',SWA13150
6T46,'FT) /FT)**2 ',T66,' (FT,RAD,TON,TON*FT) ',T100,' (RAD/SEC)'/SWA13160
7T66,'**2*SEC'//) SWA13170
3003 FORMAT(//T118,'HEAVE(FT)') SWA13180
3004 FORMAT(T11,F10.5,T26,G15.6,T46,G15.6,T66,G15.6,T100,F10.5) SWA13190
3005 FORMAT(/13X,'R.M.S. OF THE PROCESS (AMPLITUDE) =',T60,G15.6/13X,'RSWA13200
1.M.S. OF THE PEAKS(AMPLITUDE)',T60,G15.6/13X,'SIGNIFICANT RESPONSESWA13210
2(1/3) (AMPLITUDE)',T60,G15.6/13X,'AVERAGE 1/1000 RESPONSE (AMP)SWA13220
3LITUDE) ',T60,G15.6//) SWA13230
3006 FORMAT(//T118,'PITCH(RAD)') SWA13240
3007 FORMAT(//T118,'TRANSF'/T118,' (TON)') SWA13250
3008 FORMAT(//T118,'BENMOM'/T118,' (TON*FT)') SWA13260
3009 FORMAT(//T118,'YAWMOM'/T118,' (TON*FT)') SWA13270
3010 FORMAT(//T118,'SWAY(FT)') SWA13280
3011 FORMAT(//T118,'ROLL(RAD)') SWA13290
3012 FORMAT(//T118,'YAW(RAD)') SWA13300
3013 FORMAT(//T118,'VERTSF'/T118,' (TON)') SWA13310
3014 FORMAT(//T118,'TORMOM'/T118,' (TON*FT)') SWA13320
3015 FORMAT(/5X,'BRETSCHNEIDER SEA SPECTRUM') SWA13330
3016 FORMAT(/5X,'PIERSON-MOSKOWITZ SEA SPECTRUM') SWA13340
RETURN SWA13350
END SWA13360
SUBROUTINE SHORT(MD,ML,NW,V,NALPHA,BER,GRAV) SWA13370
COMMON/SCREST/RSE2(10,10),RSE3(10,10),RSE4(10,10),RSE5(10,10), SWA13380
CRSE6(10,10),RSV2(10,10),RSV3(10,10),RSV4(10,10),RSV5(10,10), SWA13390
CRSV6(10,10),ALPHA(10),ZETA13(10),OMP(10) SWA13400
DIMENSION DAP(11),SE2(12),SE3(12),SE4(12),SE5(12),SE6(12), SWA13410
C SV2(12),SV3(12),SV4(12),SV5(12),SV6(12) SWA13420
DATA SE2/12*0.0/,SE3/12*0.0/,SE4/12*0.0/,SE5/12*0.0/,SE6/12*0.0/, SWA13430
C SV2/12*0.0/,SV3/12*0.0/,SV4/12*0.0/,SV5/12*0.0/,SV6/12*0.0/ SWA13440

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NA=NALPHA+1	SWA13450
NB=NA+1	SWA13460
WRITE(2,3100) V,BER	SWA13470
DAP(1)=(ALPHA(1)+90.)/57.29578	SWA13480
DAP(NA)=(90.-ALPHA(NALPHA))/57.29578	SWA13490
DO 10 I=2,NALPHA	SWA13500
10 DAP(I)=(ALPHA(I)-ALPHA(I-1))/57.29578	SWA13510
DO 5 I=1,NW	SWA13520
DO 82 J=1,NALPHA	SWA13530
SE2(J+1)=RSE2(J,I)	SWA13540
SE3(J+1)=RSE3(J,I)	SWA13550
SE4(J+1)=RSE4(J,I)	SWA13560
SE5(J+1)=RSE5(J,I)	SWA13570
SE6(J+1)=RSE6(J,I)	SWA13580
SV2(J+1)=RSV2(J,I)	SWA13590
SV3(J+1)=RSV3(J,I)	SWA13600
SV4(J+1)=RSV4(J,I)	SWA13610
SV5(J+1)=RSV5(J,I)	SWA13620
82 SV6(J+1)=RSV6(J,I)	SWA13630
ZT13=ZETA13(I)	SWA13640
OMPW=OMP(I)	SWA13650
OP=OMPW	SWA13660
IF(OP.GT.0.001) GO TO 72	SWA13670
OMPW=0.4013*SQRT(GRAV/ZT13)	SWA13680
72 IF(OP.GT.0.001) WRITE(2,3015)	SWA13690
IF(OP.LE.0.001) WRITE(2,3016)	SWA13700
WRITE(2,3101) I,ZT13,OMPW	SWA13710
IF(MD.EQ.2) GO TO 8	SWA13720
RMSE3=TRAP(DAP,SE3,NB,1)	SWA13730
RMSE5=TRAP(DAP,SE5,NB,1)	SWA13740
RMSE3=SQRT(RMSE3)	SWA13750
RMSE5=SQRT(RMSE5)	SWA13760
HMSE3=RMSE3*1.4142	SWA13770
HMSE5=RMSE5*1.4142	SWA13780
H13E3=RMSE3*2.0	SWA13790
H13E5=RMSE5*2.0	SWA13800
H10E3=RMSE3*3.95	SWA13810
H10E5=RMSE5*3.95	SWA13820
WRITE(2,3003)	SWA13830
WRITE(2,3102) (ALPHA(K),RSE3(K,I),K=1,NALPHA)	SWA13840
WRITE(2,3005) RMSE3,HMSE3,H13E3,H10E3	SWA13850
WRITE(2,3006)	SWA13860
WRITE(2,3102) (ALPHA(K),RSE5(K,I),K=1,NALPHA)	SWA13870
WRITE(2,3005) RMSE5,HMSE5,H13E5,H10E5	SWA13880
IF(V.GT.0.001) GO TO 15	SWA13890
IF(ML.EQ.0) GO TO 15	SWA13900
RMSV2=TRAP(DAP,SV2,NB,1)	SWA13910
RMSV4=TRAP(DAP,SV4,NB,1)	SWA13920
RMSV6=TRAP(DAP,SV6,NB,1)	SWA13930
RMSV2=SQRT(RMSV2)	SWA13940
RMSV4=SQRT(RMSV4)	SWA13950
RMSV6=SQRT(RMSV6)	SWA13960
HMSV2=RMSV2*1.4142	SWA13970
HMSV4=RMSV4*1.4142	SWA13980
HMSV6=RMSV6*1.4142	SWA13990
H13V2=RMSV2*2.0	SWA14000

H13V4=RMSV4*2.0	SWA14010
H13V6=RMSV6*2.0	SWA14020
H10V2=RMSV2*3.95	SWA14030
H10V4=RMSV4*3.95	SWA14040
H10V6=RMSV6*3.95	SWA14050
WRITE(2,3007)	SWA14060
WRITE(2,3102) (ALPHA(K),RSV2(K,I),K=1,NALPHA)	SWA14070
WRITE(2,3005) RMSV2,HMSV2,H13V2,H10V2	SWA14080
WRITE(2,3008)	SWA14090
WRITE(2,3102) (ALPHA(K),RSV4(K,I),K=1,NALPHA)	SWA14100
WRITE(2,3005) RMSV4,HMSV4,H13V4,H10V4	SWA14110
WRITE(2,3009)	SWA14120
WRITE(2,3102) (ALPHA(K),RSV6(K,I),K=1,NALPHA)	SWA14130
WRITE(2,3005) RMSV6,HMSV6,H13V6,H10V6	SWA14140
15 IF(MD.EQ.1) GO TO 5	SWA14150
8 RMSE2=TRAP(DAP,SE2,NB,1)	SWA14160
RMSE4=TRAP(DAP,SE4,NB,1)	SWA14170
RMSE6=TRAP(DAP,SE6,NB,1)	SWA14180
RMSE2=SQRT(RMSE2)	SWA14190
RMSE4=SQRT(RMSE4)	SWA14200
RMSE6=SQRT(RMSE6)	SWA14210
HMSE2=RMSE2*1.4142	SWA14220
HMSE4=RMSE4*1.4142	SWA14230
HMSE6=RMSE6*1.4142	SWA14240
H13E2=RMSE2*2.0	SWA14250
H13E4=RMSE4*2.0	SWA14260
H13E6=RMSE6*2.0	SWA14270
H10E2=RMSE2*3.95	SWA14280
H10E4=RMSE4*3.95	SWA14290
H10E6=RMSE6*3.95	SWA14300
WRITE(2,3010)	SWA14310
WRITE(2,3102) (ALPHA(K),RSE2(K,I),K=1,NALPHA)	SWA14320
WRITE(2,3005) RMSE2,HMSE2,H13E2,H10E2	SWA14330
WRITE(2,3011)	SWA14340
WRITE(2,3102) (ALPHA(K),RSE4(K,I),K=1,NALPHA)	SWA14350
WRITE(2,3005) RMSE4,HMSE4,H13E4,H10E4	SWA14360
WRITE(2,3012)	SWA14370
WRITE(2,3102) (ALPHA(K),RSE6(K,I),K=1,NALPHA)	SWA14380
WRITE(2,3005) RMSE6,HMSE6,H13E6,H10E6	SWA14390
IF(V.GT.0.001) GO TO 5	SWA14400
IF(ML.EQ.0) GO TO 5	SWA14410
RMSV3=TRAP(DAP,SV3,NB,1)	SWA14420
RMSV5=TRAP(DAP,SV5,NB,1)	SWA14430
RMSV3=SQRT(RMSV3)	SWA14440
RMSV5=SQRT(RMSV5)	SWA14450
HMSV3=RMSV3*1.4142	SWA14460
HMSV5=RMSV5*1.4142	SWA14470
H13V3=RMSV3*2.0	SWA14480
H13V5=RMSV5*2.0	SWA14490
H10V5=RMSV5*3.95	SWA14500
H10V3=RMSV3*3.95	SWA14510
WRITE(2,3013)	SWA14520
WRITE(2,3102) (ALPHA(K),RSV3(K,I),K=1,NALPHA)	SWA14530
WRITE(2,3005) RMSV3,HMSV3,H13V3,H10V3	SWA14540
WRITE(2,3014)	SWA14550
WRITE(2,3102) (ALPHA(K),RSV5(K,I),K=1,NALPHA)	SWA14560

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WRITE(2,3005) RMSV5,HMSV5,H13V5,H10V5
5 CONTINUE
3100 FORMAT(////1X,'IRREGULAR SEA-WAY RESPONSES : '/' SHORT CRESTED SEASWA14590
1-WAY'/1X,'SHIP SPEED (FT/SEC) =',F10.5/' MAJOR WAVE HEADING ANGLE(SWA14600
2DEG) =',F10.5/1X,'SEA SPECTRUM ; PIERSON-MOSKOWITZ SPECTRUM FOR FUSWA14610
3LLY DEVELOPED SEA'/16X,'OTHERWISE BRETSCHNEIDER SEA SPECTRUM'////) SWA14620
3101 FORMAT(5X, 'NUMBER OF SEA SPECTRUM = ',I2/5X,'SIGNIFICANT WAVE HEISWA14630
1GHT(H1/3) (FT) =',F10.5/5X,'PEAK WAVE FREQ.OF THE SPECTRUM(RAD/SEC)SWA14640
2 =',F10.5
//T11,'ALPHA ; ANGLE OF',T4SWA14650
30,'MEAN SQUARE OF RESPONSE '/T11,'WAVE COMPONENTS ',T40,'FOSWA14660
4R EACH ALPHA'/T11,'(DEGREES)',T40,'(FT,RAD,TON,TON*FT)**2'////) SWA14670
3102 FORMAT(T11,F10.5,T40,G15.5) SWA14680
3003 FORMAT(//T118,'HEAVE(FT)') SWA14690
3005 FORMAT(/13X,'R.M.S. OF THE PROCESS (AMPLITUDE) =',T60,G15.6/13X,'RSWA14700
1.M.S. OF THE PEAKS(AMPLITUDE)',T60,G15.6/13X,'SIGNIFICANT RESPONSESWA14710
2(1/3) (AMPLITUDE)',T60,G15.6/13X,'SIGNIFICANT RESPONSE(1/1000) (AMPSWA14720
3LITUDE) ',T60,G15.6////) SWA14730
3006 FORMAT(//T118,'PITCH(RAD)') SWA14740
3007 FORMAT(//T118,'TRANSF'/T118,'(TON)') SWA14750
3008 FORMAT(//T118,'BENMOM'/T118,'(TON*FT)') SWA14760
3009 FORMAT(//T118,'YAWMOM'/T118,'(TON*FT)') SWA14770
3010 FORMAT(//T118,'SWAY(FT)') SWA14780
3011 FORMAT(//T118,'ROLL(RAD)') SWA14790
3012 FORMAT(//T118,'YAW(RAD)') SWA14800
3013 FORMAT(//T118,'VERTSF'/T118,'(TON)') SWA14810
3014 FORMAT(//T118,'TORMOM'/T118,'(TON*FT)') SWA14820
3015 FORMAT(/5X,'BRETSCHNEIDER SEA SPECTRUM') SWA14830
3016 FORMAT(/5X,'PIERSON-MOSKOWITZ SEA SPECTRUM') SWA14840
RETURN SWA14850
END SWA14860
SUBROUTINE ENFQ(NROMA,NROMS,V,CBET,GRAV) SWA14870
COMMON/SPTM/OMEGAM(30),OMEGA(30) SWA14880
KA=0 SWA14890
DO 1 KK=1,NROMS SWA14900
OMO=OMEGAM(KK) SWA14910
OM=OMO-V*OMO*OMO/GRAV*CBET SWA14920
IF(ABS(OM).LE.0.1) GO TO 2 SWA14930
OMEGA(KK-KA)=OMO SWA14940
GO TO 1 SWA14950
2 KA=KA+1 SWA14960
1 CONTINUE SWA14970
NROMA=NROMS-KA SWA14980
RETURN SWA14990
END SWA15000
C*****SUB. DAVID ***** SWA15010
SUBROUTINE DAVID(X,Y,E,C,S,RA,RB,CIN,SON) SWA15020
C COMPUTATION OF EXPONENTIAL INTEGRAL WITH COMPLEX ARGUMENT SWA15030
DIMENSION F(5),D(5) SWA15040
F(1)=0.52175561 SWA15050
F(2)=0.39866681 SWA15060
F(3)=0.075942450 SWA15070
F(4)=0.003611758 SWA15080
F(5)=0.000023369972 SWA15090
D(1)=0.26356032 SWA15100
D(2)=1.4134031 SWA15110
D(3)=3.5964258 SWA15120

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D(4)=7.0858100	SWA15130
D(5)=12.640801	SWA15140
Q=3.1415927	SWA15150
AT=ATAN2(X,Y)	SWA15160
ARG=AT-.5*Q	SWA15170
E=EXP(-Y)	SWA15180
C=COS(X)	SWA15190
S=SIN(X)	SWA15200
R=X**2+Y**2	SWA15210
AL=0.5*ALOG(R)	SWA15220
A=-Y	SWA15230
B=-X	SWA15240
IF(A.GE.0.0) GO TO 78	SWA15250
IF(B.EQ.0.0) GO TO 79	SWA15260
78 IF(R.GE.100.) GO TO 10	SWA15270
79 TEST=0.00001	SWA15280
IF(R.LT.1.0) GO TO 5	SWA15290
TEST=0.1*TEST	SWA15300
IF(R.LT.2.0) GO TO 5	SWA15310
TEST=0.1*TEST	SWA15320
IF(R.LT.4.0) GO TO 5	SWA15330
TEST=0.1*TEST	SWA15340
5 CONTINUE	SWA15350
SUMC=0.57721566+AL+Y	SWA15360
SUMS=AT+X	SWA15370
TC=Y	SWA15380
TS=X	SWA15390
DO 1 K=1,500	SWA15400
TO=TC	SWA15410
COX=K	SWA15420
CAY=K+1	SWA15430
FACT=COX/CAY**2	SWA15440
TC=FACT*(Y*TC-X*TS)	SWA15450
TS=FACT*(Y*TS+X*TO)	SWA15460
SUMC=SUMC+TC	SWA15470
SUMS=SUMS+TS	SWA15480
IF(K.GE.500) GO TO 3	SWA15490
IF((ABS(TC)+ABS(TS)).GT.TEST) GO TO 1	SWA15500
3 CIN=E*(C*SUMC+S*SUMS)	SWA15510
SON=E*(S*SUMC-C*SUMS)	SWA15520
GO TO 4	SWA15530
1 CONTINUE	SWA15540
10 G1=0.	SWA15550
G2=0.	SWA15560
DO 20 I=1,5	SWA15570
DEN=(-Y+D(I))**2+X**2	SWA15580
GA=F(I)*(-Y+D(I))/DEN	SWA15590
GB=F(I)*(-X)/DEN	SWA15600
G1=G1+GA	SWA15610
20 G2=G2+GB	SWA15620
CIN=E*Q*S-G1	SWA15630
SON=- (E*Q*C+G2)	SWA15640
4 RA=AL-CIN	SWA15650
RB=ARG+SON	SWA15660
RETURN	SWA15670
END	SWA15680

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SUBROUTINE MATINV(A,N1,B,M1,DETERM,ID)
C      PIVOT METHOD
C      MATRIX INVERSION WITH ACCOMPANYING SOLUTION OF SIMUL. EQ.
C      PIVOT METHOD
C      FORTRAN IV SINGLE PRECISION WITH ADJUSTABLE DIMENSION
C      FEBRUARY 1966 S GOOD DAVID TAYLOR MODEL BASIN AM MAT4
C      WHERE CALLING PROGRAM MUST INCLUDE
C      DIMENSION A( ), B( ), INDEX( )
C      N IS THE ORDER OF A
C      M IS THE NUMBER OF COLUMN VECTORS IN B(MAY BE 0)
C      DETERM WILL CONTAIN DETERMINANT ON EXIT
C      ID WILL BE SET BY ROUTINE TO 2 IF MATRIX A IS SINGULAR
C      1 IF INVERSION WAS SUCCESSFUL
C      A THE INPUT MATRIX WILL BE REPLACED BY A INVERSE
C      B THE COLUMN VECTORS WILL BE REPLACED BY CORRESPONDING
C      SOLUTION VECTORS
C      INDEX WORKING STORAGE ARRAY
C      IF IT IS DESIRED TO SCALE THE DETERMINANT CARD MAY BE
C      DELETED AND DETERM PRESET BEFORE ENTERING THE ROUTINE
C
DIMENSION A(60,60),B(60,1),INDEX(60,3)
EQUIVALENCE (IROW,JROW), (ICOLUM,JCOLUM), (AMAX, T, SWAP)
C      INITIALIZATION
C
      N=N1
      M=M1
      DETERM = 1.0
      DO 20 J=1,N
20 INDEX(J,3) = 0
      DO 550 I=1,N
C
C      SEARCH FOR PIVOT ELEMENT
C
      AMAX = 0.0
      DO 105 J=1,N
      IF(INDEX(J,3)-1) 60, 105, 60
60 DO 100 K=1,N
      IF(INDEX(K,3)-1) 80, 100, 715
80 IF ( AMAX -ABS (A(J,K))) 85, 100, 100
85 IROW=J
      ICOLUM =K
      AMAX = ABS (A(J,K))
100 CONTINUE
105 CONTINUE
      INDEX(ICOLUM,3) = INDEX(ICOLUM,3) +1
      INDEX(I,1)=IROW
      INDEX(I,2)=ICOLUM
C
C      INTERCHANGE ROWS TO PUT PIVOT ELEMENT ON DIAGONAL
C
      IF (IROW-ICOLUM) 140, 310, 140
140 DETERM=-DETERM
      DO 200 L=1,N
      SWAP=A(IROW,L)
      A(IROW,L)=A(ICOLUM,L)

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200	A(ICOLUM,L)=SWAP	SWA16250
	IF(M) 310, 310, 210	SWA16260
210	DO 250 L=1, M	SWA16270
	SWAP=B(IROW,L)	SWA16280
	B(IROW,L)=B(ICOLUM,L)	SWA16290
250	B(ICOLUM,L)=SWAP	SWA16300
C		SWA16310
C	DIVIDE PIVOT ROW BY PIVOT ELEMENT	SWA16320
C		SWA16330
310	PIVOT =A(ICOLUM,ICOLUM)	SWA16340
	DETERM=DETERM*PIVOT	SWA16350
330	A(ICOLUM,ICOLUM)=1.0	SWA16360
	DO 350 L=1,N	SWA16370
350	A(ICOLUM,L)=A(ICOLUM,L)/PIVOT	SWA16380
	IF(M) 380, 380, 360	SWA16390
360	DO 370 L=1,M	SWA16400
370	B(ICOLUM,L)=B(ICOLUM,L)/PIVOT	SWA16410
C		SWA16420
C	REDUCE NON-PIVOT ROWS	SWA16430
C		SWA16440
380	DO 550 L1=1,N	SWA16450
	IF(L1-ICOLUM) 400, 550, 400	SWA16460
400	T=A(L1,ICOLUM)	SWA16470
	A(L1,ICOLUM)=0.0	SWA16480
	DO 450 L=1,N	SWA16490
450	A(L1,L)=A(L1,L)-A(ICOLUM,L)*T	SWA16500
	IF(M) 550, 550, 460	SWA16510
460	DO 500 L=1,M	SWA16520
500	B(L1,L)=B(L1,L)-B(ICOLUM,L)*T	SWA16530
550	CONTINUE	SWA16540
C		SWA16550
C	INTERCHANGE COLUMNS	SWA16560
C		SWA16570
	DO 710 I=1,N	SWA16580
	L=N+1-I	SWA16590
	IF (INDEX(L,1)-INDEX(L,2)) 630, 710, 630	SWA16600
630	JROW=INDEX(L,1)	SWA16610
	JCOLUM=INDEX(L,2)	SWA16620
	DO 705 K=1,N	SWA16630
	SWAP=A(K,JROW)	SWA16640
	A(K,JROW)=A(K,JCOLUM)	SWA16650
	A(K,JCOLUM)=SWAP	SWA16660
705	CONTINUE	SWA16670
710	CONTINUE	SWA16680
	DO 730 K = 1,N	SWA16690
	IF(INDEX(K,3) -1) 715,720,715	SWA16700
720	CONTINUE	SWA16710
730	CONTINUE	SWA16720
	ID = 1	SWA16730
CC		SWA16740
C		SWA16750
C	WRITE(2,1973) DETERM	SWA16760
C1973	FORMAT(' DETERMINANT =',E10.4)	SWA16770
CC		SWA16780
810	RETURN	SWA16790
715	ID = 2	SWA16800



CC		SWA16810
C	WRITE(2,1973) DETERM	SWA16820
CC		SWA16830
	GO TO 810	SWA16840
	END	SWA16850
	SUBROUTINE GMSUPH(GMA,YYI,GMASS)	SWA16860
	DIMENSION GMA(6,6)	SWA16870
	DO 10 J=3,5,2	SWA16880
	DO 10 K=2,6,2	SWA16890
10	GMA(J,K)=0.0	SWA16900
	GMA(3,3)=GMASS	SWA16910
	GMA(3,5)=0.0	SWA16920
	GMA(5,3)=0.0	SWA16930
	GMA(5,5)=YYI	SWA16940
	RETURN	SWA16950
	END	SWA16960
	SUBROUTINE GMSWRY(GMA,ZCG,XXI,ZZI,XZI,GMASS)	SWA16970
	DIMENSION GMA(6,6)	SWA16980
	DO 10 J=2,6,2	SWA16990
	DO 10 K=3,5,2	SWA17000
10	GMA(J,K)=0.0	SWA17010
	GMA(2,2)=GMASS	SWA17020
	GMA(2,4)=-GMASS*ZCG	SWA17030
	GMA(2,6)=0.0	SWA17040
	GMA(4,2)=GMA(2,4)	SWA17050
	GMA(4,4)=XXI	SWA17060
	GMA(4,6)=-XZI	SWA17070
	GMA(6,2)=0.0	SWA17080
	GMA(6,4)=-XZI	SWA17090
	GMA(6,6)=ZZI	SWA17100
	RETURN	SWA17110
	END	SWA17120
	SUBROUTINE ASUPH(A,AZZ,BZZ,V,RT,A33,B33,XI,DX,NSTA,NSP)	SWA17130
	COMMON X(27),RA,RB,RTV,BZZV	SWA17140
	DIMENSION A(6,6),A33(27),B33(27),XI(27),DX(27)	SWA17150
	DO 10 J=3,5,2	SWA17160
	DO 10 K=2,6,2	SWA17170
10	A(J,K)=0.0	SWA17180
	RTV=RT*V	SWA17190
	RA=RTV*A33(NSTA)	SWA17200
	RB=RT*B33(NSTA)	SWA17210
	AZZ=TRAP(DX,A33,NSTA,NSP)	SWA17220
	BZZ=TRAP(DX,B33,NSTA,NSP)	SWA17230
	BZZV=RT*BZZ	SWA17240
	DO 20 I=1,NSTA	SWA17250
20	X(I)=XI(I)*A33(I)	SWA17260
	AZZ1=TRAP(DX,X,NSTA,NSP)	SWA17270
	DO 30 I=1,NSTA	SWA17280
30	X(I)=X(I)*XI(I)	SWA17290
	AZZ2=TRAP(DX,X,NSTA,NSP)	SWA17300
	A(3,3)=AZZ-RB	SWA17310
	RB=RB*XI(NSTA)	SWA17320
	A(3,5)=-AZZ1-BZZV+RB-RA	SWA17330
	A(5,3)=-AZZ1+BZZV+RB	SWA17340
	A(5,5)=AZZ2+RTV*AZZ+XI(NSTA)*(-RB+RA)	SWA17350
	RETURN	SWA17360

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END SWA17370
SUBROUTINE ASWRY(A,V,A22,A44,A24,B22,B44,B24,XI,DX,AXX,AYY,AYX,BYY SWA17380
C ,BYX,RT,NSTA,NSP) SWA17390
COMMON X(27),RTV,RAYY,RBYX,BYYV,BYXV,AYX1,AYY1,AYY2 SWA17400
DIMENSION A(6,6),A22(27),B22(27),A24(27),B24(27),A44(27),B44(27), SWA17410
C XI(27),DX(27) SWA17420
DO 10 J=2,6,2 SWA17430
DO 10 K=3,5,2 SWA17440
10 A(J,K)=0.0 SWA17450
RTV=RT*V SWA17460
RAYY=RTV*A22(NSTA) SWA17470
RBYX=RT*B22(NSTA) SWA17480
RBYX=RT*B24(NSTA) SWA17490
AYY=TRAP(DX,A22,NSTA,NSP) SWA17500
AYX=TRAP(DX,A24,NSTA,NSP) SWA17510
AXX=TRAP(DX,A44,NSTA,NSP) SWA17520
BYY=TRAP(DX,B22,NSTA,NSP) SWA17530
BYX=TRAP(DX,B24,NSTA,NSP) SWA17540
BYYV=RT*BYY SWA17550
BYXV=RT*BYX SWA17560
DO 20 I=1,NSTA SWA17570
20 X(I)=XI(I)*A24(I) SWA17580
AYX1=TRAP(DX,X,NSTA,NSP) SWA17590
DO 30 I=1,NSTA SWA17600
30 X(I)=XI(I)*A22(I) SWA17610
AYY1=TRAP(DX,X,NSTA,NSP) SWA17620
DO 40 I=1,NSTA SWA17630
40 X(I)=X(I)*XI(I) SWA17640
AYY2=TRAP(DX,X,NSTA,NSP) SWA17650
A(2,2)=AYY-RBYX SWA17660
A(2,4)=AYX-RBYX SWA17670
RBYX=RBYX*XI(NSTA) SWA17680
RBYX=RBYX*XI(NSTA) SWA17690
A(2,6)=AYY1+BYYV-RBYX+RAYY SWA17700
A(4,2)=A(2,4) SWA17710
A(4,4)=AXX-RT*B44(NSTA) SWA17720
A(4,6)=AYX1+BYXV-RBYX-RTV*A44(NSTA) SWA17730
A(6,2)=AYY1-BYYV-RBYX SWA17740
A(6,4)=AYX1-BYXV-RBYX SWA17750
A(6,6)=AYY2+RTV*AYY+XI(NSTA)*(-RBYX+RAYY) SWA17760
RETURN SWA17770
END SWA17780
SUBROUTINE BSUPH(B,AZZ,BZZ,V,RT,A33,B33,XI,DX,NSTA,NSP) SWA17790
COMMON X(27),RA,RB,VAZZ,RTV,BZZ1,BZZ2 SWA17800
DIMENSION B(6,6),A33(27),B33(27),XI(27),DX(27) SWA17810
DO 10 J=3,5,2 SWA17820
DO 10 K=2,6,2 SWA17830
10 B(J,K)=0.0 SWA17840
RA=V*A33(NSTA) SWA17850
RTV=RT*V SWA17860
RB=RTV*B33(NSTA) SWA17870
DO 20 I=1,NSTA SWA17880
20 X(I)=XI(I)*B33(I) SWA17890
BZZ1=TRAP(DX,X,NSTA,NSP) SWA17900
DO 30 I=1,NSTA SWA17910
30 X(I)=X(I)*XI(I) SWA17920

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BZZ2=TRAP(DX,X,NSTA,NSP)
B(3,3)=BZZ+RA
RA=RA*XI(NSTA)
VAZZ=V*AZZ
B(3,5)=-BZZ1+VAZZ-RA-RB
B(5,3)=-BZZ1-VAZZ-RA
B(5,5)=BZZ2+RTV*BZZ+XI(NSTA)*(RA+RB)
RETURN
END
SUBROUTINE BSWRY(B,V,A22,A44,A24,B22,B44,B24,XI,DX,AXX,AYY,AYX,BYY
C ,BYX,RT,ROLVMX,VISCK,NSTA,NSP)
COMMON X(27),RTV,RAYY,RAYX,RBYX,BYX1,BY1,BY2,VAYY,VAYX,BXX
DIMENSION B(6,6),A22(27),B22(27),A24(27),B24(27),A44(27),B44(27),
C XI(27),DX(27)
DO 10 J=2,6,2
DO 10 K=3,5,2
10 B(J,K)=0.0
RTV=RT*V
RAYY=V*A22(NSTA)
RAYX=V*A24(NSTA)
RBYX=RTV*B22(NSTA)
BXX=TRAP(DX,B44,NSTA,NSP)
DO 20 I=1,NSTA
20 X(I)=XI(I)*B24(I)
BYX1=TRAP(DX,X,NSTA,NSP)
DO 30 I=1,NSTA
30 X(I)=XI(I)*B22(I)
BYY1=TRAP(DX,X,NSTA,NSP)
DO 40 I=1,NSTA
40 X(I)=X(I)*XI(I)
BYY2=TRAP(DX,X,NSTA,NSP)
B(2,2)=BYY+RAYY
B(2,4)=BYX+RAYX
RAYY=RAYY*XI(NSTA)
RAYX=RAYX*XI(NSTA)
VAYY=V*AYY
VAYX=V*AYX
B(2,6)=BYY1-VAYY+RAYY+RBYX
B(4,2)=B(2,4)
B(4,4)=BXX+V*A44(NSTA)+VISCK*ROLVMX
B(4,6)=BYX1-VAYX+RAYX+RTV*B24(NSTA)
B(6,2)=BYY1+VAYY+RAYY
B(6,4)=BYX1+VAYX+RAYX
B(6,6)=BYY2+RTV*BYY+XI(NSTA)*(RAYY+RBYX)
RETURN
END
SUBROUTINE CSUPH(C,RHO,GRAV,YM,XI,DX,NSTA,NSP)
COMMON X(27),WGTD
DIMENSION C(6,6),YM(27),XI(27),DX(27)
DO 10 J=3,5,2
DO 10 K=2,6,2
10 C(J,K)=0.0
WGTD=RHO*GRAV
C(3,3)=WGTD*TRAP(DX,YM,NSTA,NSP)
DO 20 I=1,NSTA
20 X(I)=YM(I)*XI(I)

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C(3,5)=-WGTD*TRAP(DX,X,NSTA,NSP)
C(5,3)=C(3,5)
DO 30 I=1,NSTA
30 X(I)=X(I)*XI(I)
C(5,5)=-WGTD*TRAP(DX,X,NSTA,NSP)
RETURN
END
SUBROUTINE CSWRY(C,DMN,GM)
DIMENSION C(6,6)
DO 10 J=2,6,2
DO 10 K=2,6
10 C(J,K)=0.0
C(4,4)=DMN*GM
RETURN
END
SUBROUTINE FSUPH(F,RHO,DMN,ZETAA,F3,H3,RTO,XI,DX,NSTA,NSP)
COMPLEX F(6),F3(27),H3(27),ZRT,X,WTRAP,CMLPX
COMMON ZRT,X(27),GZ
DIMENSION XI(27),DX(27)
ZRT=CMLPX(0.,-RTO)
GZ=RHO*ZETAA/DMN
DO 10 I=1,NSTA
10 X(I)=F3(I)+H3(I)
F(3)=GZ*(WTRAP(DX,X,NSTA,NSP)+ZRT*H3(NSTA))
DO 20 I=1,NSTA
20 X(I)=X(I)*XI(I)+ZRT*H3(I)
F(5)=-GZ*(WTRAP(DX,X,NSTA,NSP)+ZRT*XI(NSTA)*H3(NSTA))
RETURN
END
SUBROUTINE MTSUPH(ETA,GMA,A,B,C,F,OM,DMN)
COMPLEX F(6),D(6,6),ETA(6),DET,ZI,CMLPX
COMMON ZI,DET,D
DIMENSION GMA(6,6),A(6,6),B(6,6),C(6,6)
OM2=OM*OM
ZI=CMLPX(0.,OM)
DO 10 J=3,5,2
DO 10 K=3,5,2
10 D(J,K)=(OM2*(-GMA(J,K)-A(J,K))+ZI*B(J,K)+C(J,K))/DMN
DET=D(3,3)*D(5,5)-D(3,5)*D(5,3)
ETA(1)=(0.,0.)
ETA(3)=(F(3)*D(5,5)-F(5)*D(3,5))/DET
ETA(5)=(F(5)*D(3,3)-F(3)*D(5,3))/DET
RETURN
END
SUBROUTINE MTSWRY(ETA,GMA,A,B,C,F,OM,DMN)
COMPLEX F(6),D(6,6),ETA(6),DET,ZI,CMLPX
COMMON ZI,DET,D
DIMENSION GMA(6,6),A(6,6),B(6,6),C(6,6)
OM2=OM*OM
ZI=CMLPX(0.,OM)
DO 10 J=2,6,2
DO 10 K=2,6,2
10 D(J,K)=(OM2*(-GMA(J,K)-A(J,K))+ZI*B(J,K)+C(J,K))/DMN
DET=D(2,2)*(D(4,4)*D(6,6)-D(4,6)*D(6,4))
C +D(2,4)*(D(4,6)*D(6,2)-D(4,2)*D(6,6))
C +D(2,6)*(D(4,2)*D(6,4)-D(4,4)*D(6,2))

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ETA(2)=(F(2)*(D(4,4)*D(6,6)-D(4,6)*D(6,4))
1      +F(4)*(D(2,6)*D(6,4)-D(2,4)*D(6,6))
2      +F(6)*(D(2,4)*D(4,6)-D(2,6)*D(4,4)))/DET
ETA(4)=(F(2)*(D(4,6)*D(6,2)-D(4,2)*D(6,6))
3      +F(4)*(D(6,6)*D(2,2)-D(6,2)*D(2,6))
4      +F(6)*(D(2,6)*D(4,2)-D(2,2)*D(4,6)))/DET
ETA(6)=(F(2)*(D(4,2)*D(6,4)-D(4,4)*D(6,2))
5      +F(4)*(D(6,2)*D(2,4)-D(6,4)*D(2,2))
6      +F(6)*(D(2,2)*D(4,4)-D(2,4)*D(4,2)))/DET
RETURN
END
FUNCTION TRAP(DX,Y,N,M)
DIMENSION DX(1),Y(1)
TRAP=0.0
N1=N-1
IF(M.EQ.1) GO TO 20
DO 10 I=2,N1
10 TRAP=TRAP+Y(I)
TRAP=DX(1)*(0.5*(Y(1)+Y(N))+TRAP)
RETURN
20 DO 30 I=1,N1
30 TRAP=TRAP+DX(I)*(Y(I)+Y(I+1))
TRAP=0.5*TRAP
RETURN
END
SUBROUTINE ZANGLE(Z,A,P)
COMPLEX Z
A=CABS(Z)
ZR=REAL(Z)
ZI=AIMAG(Z)
IF(A.LE. 0.1E-15) GO TO 1
P=ARCOS(ZR/A)
P=-P*57.29578
IF(ZI.GE.0.0) P=-P-360.
GO TO 2
1 P= 0.1E-15
2 RETURN
END
SUBROUTINE HYFOIL(A,B,C,F,CHLR,CHDR,HF3,XHFO,HA3,V)
COMPLEX F(6),HF3
DIMENSION A(6,6),B(6,6),C(6,6)
CHLD=CHLR+CHDR
A(3,3)=A(3,3)+HA3
B(3,3)=B(3,3)+CHLD
A(3,5)=A(3,5)-XHFO*HA3
B(3,5)=B(3,5)-XHFO*CHLD
C(3,5)=C(3,5)+CHLR*V
F(3)=F(3)+HF3
XHFS=XHFO*XHFO
A(5,5)=A(5,5)+XHFS*HA3
B(5,5)=B(5,5)+XHFS*CHLD
C(5,5)=C(5,5)-CHLR*XHFO*V
A(5,3)=A(5,3)-XHFO*HA3
B(5,3)=B(5,3)-XHFO*CHLD
F(5)=F(5)-XHFO*HF3
RETURN
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SWA19470
SWA19480
SWA19490
SWA19500
SWA19510
SWA19520
SWA19530
SWA19540
SWA19550
SWA19560
SWA19570
SWA19580
SWA19590
SWA19600

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END
SUBROUTINE RECT(F,DMN,DISPL,NPL,OM2,RHD)
COMPLEX QDD,QL2,QL3,QL4,F(6),QFH2,QFH3,QFH4,ZUNIT
COMMON/CMFRDB/QDD(6),QL2,QL3,QL4,QFH2,QFH3,QFH4,ZUNIT,XL(31)
C, YL(31),ICAT,IXYN
ZUNIT=(0.0,1.0)
NPLM=NPL-1
AREA=0.0
DO 10 I=1,NPLM
II=I+1
XYI=(XL(II)-XL(I))*(YL(II)+YL(I))
10 AREA=AREA-XYI
NBEA=0
IF(ABS(OM2).LE.0.00001) NBEA=1
HXLEQ=DISPL/AREA/2.0
CKL=OM2*HXLEQ
SKLC=SIN(CKL)
CKLC=COS(CKL)
SOM2=2.0*SKLC/OM2
IF(NBEA.EQ.1) SOM2=2.0*HXLEQ
QDD(2)=QL2*SOM2
QDD(3)=QL3*SOM2
QDD(4)=QL4*SOM2
IF(NBEA.EQ.1) GOTO 11
THC=2.0*HXLEQ*CKLC
QDD(5)=(QDD(3)-QL3*THC)/OM2/ZUNIT
QDD(6)=(QDD(2)-QL2*THC)/OM2/ZUNIT
11 FSOM=SOM2/DMN*RHD
F(2)=QFH2*FSOM
F(3)=QFH3*FSOM
F(4)=QFH4*FSOM
IF(NBEA.EQ.1) GOTO 12
FTHC=THC/DMN*RHD
F(5)=(QFH3*FTHC-F(3))/OM2/ZUNIT
F(6)=(F(2)-QFH2*FTHC)/OM2/ZUNIT
GOTO 13
12 F(5)=(0.0,0.0)
F(6)=(0.0,0.0)
13 RETURN
END
SUBROUTINE DBLIQ(NPL,WFREQ,BET,DMN,GRAV,RHO)
COMPLEX QDD,QL2,QL3,QL4,QFH2,QFH3,QFH4,FR2,FR3,FR4,HD2,HD3,HD4
C, ZUNIT
COMMON/CMFRDB/QDD(6),QL2,QL3,QL4,QFH2,QFH3,QFH4,ZUNIT,XL(31)
C, YL(31),ICAT,IXYN
COMMON/SAM/X(31),Y(31),XK(30),YY(30),THY(30),SNE(30),CSE(30)
C,DUL(30),POTCEN(30,30),POTCOD(30,30),POTSEN(30,30),POTSOD(30,30)
C,VELCEN(30,30),VELCOD(30,30),VELSEN(30,30),VELSOD(30,30)
C,C,CC,NSEG,NPT,CS,PHI,HPH,TPH,NSET
COMMON/SOMA/VEVN(60,60),VODD(60,60),STEN(60,1),STOD(60,1)
COMMON/FM/XA(31),YA(31),WKK(20),XXA(30),YYA(30),DAL(30),FN4(30)
DIMENSION PEC(30),PES(30),POC(30),POS(30)
NNN=6
NPT=NPL
ZUNIT=(0.0,1.0)
RG=RHO*GRAV

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SWA19610  
SWA19620  
SWA19630  
SWA19640  
SWA19650  
SWA19660  
SWA19670  
SWA19680  
SWA19690  
SWA19700  
SWA19710  
SWA19720  
SWA19730  
SWA19740  
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SWA19960  
SWA19970  
SWA19980  
SWA19990  
SWA20000  
SWA20010  
SWA20020  
SWA20030  
SWA20040  
SWA20050  
SWA20060  
SWA20070  
SWA20080  
SWA20090  
SWA20100  
SWA20110  
SWA20120  
SWA20130  
SWA20140  
SWA20150  
SWA20160

PHI=3.141593	SWA20170
HPH=1.570796	SWA20180
TPH=2.0*PHI	SWA20190
BET=180.0-BET	SWA20200
BETA=BET/57.29578	SWA20210
CBET=COS(BETA)	SWA20220
C=1.0/CBET	SWA20230
CC=C*C	SWA20240
CS=SQRT(CC-1.0)	SWA20250
WK=WFREQ*WFREQ/GRAV	SWA20260
TRW=2.0*RHO*WFREQ	SWA20270
TK=TRW/WK	SWA20280
DO 993 I=1,NPT	SWA20290
XA(I)=XL(I)	SWA20300
993 YA(I)=YL(I)	SWA20310
NSEG=NPT-1	SWA20320
NSET=2*NSEG	SWA20330
DO 11 J=1,NSEG	SWA20340
JJ=J+1	SWA20350
XXA(J)=(XA(J)+XA(JJ))/2.0	SWA20360
YYA(J)=(YA(J)+YA(JJ))/2.0	SWA20370
XINT=XA(JJ)-XA(J)	SWA20380
YINT=YA(JJ)-YA(J)	SWA20390
THY(J)=ATAN2(YINT,XINT)	SWA20400
DAL(J)=SQRT(XINT**2+YINT**2)	SWA20410
SNE(J)=YINT/DAL(J)	SWA20420
CSE(J)=XINT/DAL(J)	SWA20430
11 FN4(J)=-CSE(J)*XXA(J)-SNE(J)*YYA(J)	SWA20440
WV=WK*CBET	SWA20450
X(1)=XA(1)*WV	SWA20460
Y(1)=YA(1)*WV	SWA20470
FR2=0.0	SWA20480
FR3=0.0	SWA20490
FR4=0.0	SWA20500
DO 10 J=2,NPT	SWA20510
JM=J-1	SWA20520
X(J)=XA(J)*WV	SWA20530
Y(J)=YA(J)*WV	SWA20540
XX(JM)=XXA(JM)*WV	SWA20550
YY(JM)=YYA(JM)*WV	SWA20560
DUL(JM)=DAL(JM)*WV	SWA20570
EKYF=EXP(C*YY(JM))*WFREQ	SWA20580
CSX=CS*XX(JM)	SWA20590
WC=COS(CSX)	SWA20600
WS=SIN(CSX)	SWA20610
ERD=EKYF*TK*DAL(JM)/RHO	SWA20620
FR2=FR2+SNE(JM)*ERD*WS	SWA20630
FR4=FR4+FN4(JM)*ERD*WS	SWA20640
FR3=FR3+CSE(JM)*ERD*WC*ZUNIT	SWA20650
STEN(JM,1)=(SNE(JM)/C*WS*CS+CSE(JM)*WC)*EKYF	SWA20660
STEN(JM+NSEG,1)=0.00	SWA20670
STOD(JM,1)=0.00	SWA20680
STOD(JM+NSEG,1)=(-SNE(JM)/C*WC*CS+CSE(JM)*WS)*EKYF	SWA20690
10 CONTINUE	SWA20700
CALL APG	SWA20710
CALL SOURCE	SWA20720

CALL MATINV (VEVN,NSET,STEN,1,DOG, ID)	SWA20730
CALL MATINV (VODD,NSET,STOD,1,DOG, ID)	SWA20740
DO 55 I=1,NSEG	SWA20750
PETC=0.00	SWA20760
PETS=0.00	SWA20770
POTC=0.00	SWA20780
POTS=0.00	SWA20790
DO 56 J=1,NSEG	SWA20800
JN=J+NSEG	SWA20810
PETC=PETC+STEN (J,1)*POTCEN (I,J)-STEN (JN,1)*POTSEN (I,J)	SWA20820
PETS=PETS+STEN (J,1)*POTSEN (I,J)+STEN (JN,1)*POTCEN (I,J)	SWA20830
POTC=POTC+STOD (J,1)*POTCOD (I,J)-STOD (JN,1)*POTSOD (I,J)	SWA20840
56 POTS=POTS+STOD (J,1)*POTSOD (I,J)+STOD (JN,1)*POTCOD (I,J)	SWA20850
PEC (I)=PETC/WV*DAL (I)	SWA20860
PES (I)=PETS/WV*DAL (I)	SWA20870
POC (I)=POTC/WV*DAL (I)	SWA20880
55 POS (I)=POTS/WV*DAL (I)	SWA20890
FSS=0.00	SWA20900
FSC=0.00	SWA20910
FRS=0.00	SWA20920
FRC=0.00	SWA20930
FHS=0.00	SWA20940
FHC=0.00	SWA20950
DSS=0.0	SWA20960
DSC=0.0	SWA20970
DRS=0.0	SWA20980
DRC=0.0	SWA20990
DHS=0.0	SWA21000
DHC=0.0	SWA21010
DO 13 I=1,NSEG	SWA21020
FSS=FSS+SNE (I)*POS (I)	SWA21030
FSC=FSC-SNE (I)*POC (I)	SWA21040
FRS=FRS+FN4 (I)*POS (I)	SWA21050
FRC=FRC-FN4 (I)*POC (I)	SWA21060
FHS=FHS-CSE (I)*PES (I)	SWA21070
FHC=FHC+CSE (I)*PEC (I)	SWA21080
DSS=DSS-SNE (I)*PES (I)	SWA21090
DSC=DSC+SNE (I)*PEC (I)	SWA21100
DRS=DRS-FN4 (I)*PES (I)	SWA21110
DRC=DRC+FN4 (I)*PEC (I)	SWA21120
DHC=DHC-CSE (I)*POC (I)	SWA21130
13 DHS=DHS+CSE (I)*POS (I)	SWA21140
FSS=FSS*TRW/RHO	SWA21150
FSC=FSC*TRW/RHO	SWA21160
FHS=FHS*TRW/RHO	SWA21170
FHC=FHC*TRW/RHO	SWA21180
FRS=FRS*TRW/RHO	SWA21190
FRC=FRC*TRW/RHO	SWA21200
FR2=-AIMAG (FR2)-ZUNIT*REAL (FR2)	SWA21210
FR3= AIMAG (FR3)+ZUNIT*REAL (FR3)	SWA21220
FR4=-AIMAG (FR4)-ZUNIT*REAL (FR4)	SWA21230
HD2=-FSC-ZUNIT*FSS	SWA21240
HD3= FHC+ZUNIT*FHS	SWA21250
HD4=-FRC-ZUNIT*FRS	SWA21260
QFH2=FR2+HD2	SWA21270
QFH3=FR3+HD3	SWA21280



QFH4=FR4+HD4	SWA21290
QL2=(-DSC-ZUNIT*DSS)*TRW/2.0/RHO	SWA21300
QL4=(-DRC-ZUNIT*DRS)*TRW/2.0/RHO	SWA21310
QL3=(DHC+ZUNIT*DHS)*TRW/2.0/RHO	SWA21320
RETURN	SWA21330
END	SWA21340
SUBROUTINE APG	SWA21350
COMMON/SAM/X(31),Y(31),XX(30),YY(30),THY(30),SNE(30),CSE(30)	SWA21360
C,DUL(30),POTCEN(30,30),POTCOD(30,30),POTSEN(30,30),POTSOD(30,30)	SWA21370
C,VELCEN(30,30),VELCOD(30,30),VELSEN(30,30),VELSOD(30,30)	SWA21380
C,C,CC,NSEG,NPT,CS,PHI,HPH,TPH,NSET	SWA21390
COMMON/AGFL/AX3(5),AX4(5),AP2(5),AX1(5),AX2(5),AY3(5),AP3(5)	SWA21400
1,AP4(5),BX3(5),BX4(5),BP2(5),BX1(5),BX2(5),BY3(5),BP3(5),BP4(5)	SWA21410
2,XSQ(79),DFU(53),DFF(79)	SWA21420
3,DU,DH,IU,U,UU,H,HCU,AJS	SWA21430
COMMON/SAS/BKM(37)	SWA21440
H=SQRT(0.500)	SWA21450
DH=1.4E-01	SWA21460
XP=1.E 00	SWA21470
DO 10 I=1,79	SWA21480
XSQ(I)=SQRT(XP*XP+1.000000)	SWA21490
10 XP=XP+DH	SWA21500
DO 11 J=1,NSEG	SWA21510
JJ=J+1	SWA21520
SDXY=1.00	SWA21530
U=ABS(CSE(J))	SWA21540
IF(U.LT.0.1) GOTO 17	SWA21550
UU=U*U	SWA21560
AJ=SNE(J)/CSE(J)	SWA21570
AJS=ABS(AJ)	SWA21580
CU=CC-UU	SWA21590
HCU=0.50/CU	SWA21600
CAJ=C*AJ	SWA21610
SDX=X(JJ)-X(J)	SWA21620
IF(SDX.LT.0.0) SDXY=-1.00	SWA21630
GOTO 18	SWA21640
17 AJS=110.	SWA21650
U=1.0	SWA21660
SDY=Y(JJ)-Y(J)	SWA21670
IF(SDY.LT.0.0) SDXY=-1.00	SWA21680
18 IU=NUMU(U)	SWA21690
DU=1./(IU-1)	SWA21700
DX=0.000000	SWA21710
DO 12 JU=1,IU	SWA21720
DXX=DX*DX	SWA21730
IF(AJS.GE.100.0) GO TO 15	SWA21740
DFU(JU)=(DXX+CC)*(DXX+UU)	SWA21750
GO TO 12	SWA21760
15 DFU(JU)=DXX+CC	SWA21770
12 DX=DX+DU	SWA21780
DX=1.000000	SWA21790
DO 13 JU=1,79	SWA21800
DXX=DX*DX	SWA21810
IF(AJS.GE.100.0) GO TO 16	SWA21820
DFF(JU)=(DXX+CC)*(DXX+UU)	SWA21830
GO TO 13	SWA21840

16	DFF(JU)=DXX+CC	SWA21850
13	DX=DX+DH	SWA21860
	DO 11 I=1,NSEG	SWA21870
	AAIJ=XX(I)-X(J)	SWA21880
	AAIJJ=XX(I)-X(JJ)	SWA21890
	AMIJ=ABS(AAIJ)	SWA21900
	AMIJJ=ABS(AAIJJ)	SWA21910
	ABIJ=XX(I)+X(J)	SWA21920
	ABIJJ=XX(I)+X(JJ)	SWA21930
	BIJ=YY(I)+Y(J)	SWA21940
	BIJJ=YY(I)+Y(JJ)	SWA21950
	CALL FILON(AMIJ,AMIJJ,ABIJ,ABIJJ,BIJ,BIJJ,C,CC)	SWA21960
	CMIJ=CS*AAIJ	SWA21970
	CMJJ=CS*AAIJJ	SWA21980
	CPIJ=CS*ABIJ	SWA21990
	CPJJ=CS*ABIJJ	SWA22000
	EY=EXP(C*BIJ)	SWA22010
	EYJ=EXP(C*BIJJ)	SWA22020
	CXM=COS(CMIJ)*EY	SWA22030
	CXP=COS(CPIJ)*EY	SWA22040
	CXMJ=COS(CMJJ)*EYJ	SWA22050
	CXPJ=COS(CPJJ)*EYJ	SWA22060
	SXM=SIN(CMIJ)*EY	SWA22070
	SXP=SIN(CPIJ)*EY	SWA22080
	SXMJ=SIN(CMJJ)*EYJ	SWA22090
	SXPJ=SIN(CPJJ)*EYJ	SWA22100
	IF(AJS.GE.100.0) GOTO 19	SWA22110
	CCU=C/CC	SWA22120
	CXM=CXM*CCU	SWA22130
	CXP=CXP*CCU	SWA22140
	CXMJ=CXMJ*CCU	SWA22150
	CXPJ=CXPJ*CCU	SWA22160
	SXM=SXM*CCU	SWA22170
	SXP=SXP*CCU	SWA22180
	SXMJ=SXMJ*CCU	SWA22190
	SXPJ=SXPJ*CCU	SWA22200
	MM=1	SWA22210
	CJJ=1.0	SWA22220
	CJ=1.0	SWA22230
	IF(AAIJ.LE.0.0.AND.AAIJJ.LE.0.0) GOTO 21	SWA22240
	IF(AAIJ.GT.0.0.AND.AAIJJ.LT.0.0) GOTO 22	SWA22250
	IF(AAIJ.LT.0.0.AND.AAIJJ.GT.0.0) GOTO 23	SWA22260
	GOTO 24	SWA22270
21	CJJ=-1.0	SWA22280
	CJ=-1.0	SWA22290
	GOTO 24	SWA22300
22	MM=2	SWA22310
	CJJ=-1.0	SWA22320
	CJ=1.0	SWA22330
	GOTO 24	SWA22340
23	MM=3	SWA22350
	CJJ=1.0	SWA22360
	CJ=-1.0	SWA22370
24	APP=CJJ*AX4(5)-CJ*AX4(4)+C*(CJJ*AP2(5)-CJ*AP2(4))+AJ*(AP3(5)-AP3(4)+CAJ*(AP4(4)-AP4(5))	SWA22380
	BPP=BX4(4)-BX4(5)+C*(BP2(4)-BP2(5))+AJ*(BP3(5)-BP3(4))+CAJ*(BP4(4)	SWA22390
		SWA22400

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C)-BP4(5) SWA22410
  AYY=CJ*AX3(4)-CJJ*AX3(5)+C*(CJJ*AX4(5)-CJ*AX4(4))+AJ*(AY3(5)-AY3(4)
C))+CAJ*(AP3(5)-AP3(4)) SWA22420
  BYY=BX3(5)-BX3(4)+C*(BX4(4)-BX4(5))+AJ*(BY3(5)-BY3(4))+CAJ*(BP3(5)
C)-BP3(4)) SWA22440
  AXX=AX1(4)-AX1(5)+C*(AX2(4)-AX2(5))+AJ*(CJ*AX3(4)-CJJ*AX3(5))+CAJ*
C(CJJ*AX4(5)-CJ*AX4(4)) SWA22460
  BXX=BX1(5)-BX1(4)+C*(BX2(5)-BX2(4))+AJ*(BX3(4)-BX3(5))+CAJ*(BX4(5)
C)-BX4(4)) SWA22470
  VXC1=CJJ*(CAJ*CXMJ-CS*SXMJ)-CJ*(CAJ*CXM-CS*SXM) SWA22480
  VXC2=CAJ*(CXPJ-CXP)+CS*(SXPJ-SXP) SWA22490
  VXS1=CAJ*(SXM-SXMJ)+CS*(CXM-CXMJ) SWA22500
  VXS2=CAJ*(SXP-SXPJ)-CS*(CXP-CXPJ) SWA22510
  WC1=(CJJ*(CAJ*SXMJ+CS*CXMJ)-CJ*(CAJ*SXM+CS*CXM))/CS SWA22520
  WC2=-VXS2/CS SWA22530
  WS2=VXC2/CS SWA22540
  WS1=(CAJ*(CXMJ-CXM)-CS*(SXMJ-SXM))/CS SWA22550
  VYC1=C*WC1 SWA22560
  VYC2=C*WC2 SWA22570
  VYS1=C*WS1 SWA22580
  VYS2=C*WS2 SWA22590
  IF(MM-2) 20,25,25 SWA22600
25 ETA=BIJ+AAIJ*AJ SWA22610
  EC=EXP(ETA*C)/CU SWA22620
  EU=EXP(ETA*U)/CU SWA22630
  ECC=CC*EC SWA22640
  AA3=(UU*EU-ECC)*PHI SWA22650
  AA4=(C*EC-U*EU)*PHI SWA22660
  AA2=(EC-EU)*PHI SWA22670
  VX1=2.0*AJ*ECC SWA22680
  W1=2.0*C*EC SWA22690
  VY1=C*W1 SWA22700
  CON=1.0 SWA22710
  IF(MM.EQ.3) CON=-1.0 SWA22720
  APP=APP+CON*(AA4+C*AA2) SWA22730
  AYY=AYY+CON*(-AA3+C*AA4) SWA22740
  AXX=AXX+CON*(-AJ*AA3+CAJ*AA4) SWA22750
  WC1=WC1+CON*W1 SWA22760
  VXC1=VXC1+CON*VX1 SWA22770
  VYC1=VYC1+CON*VY1 SWA22780
  GOTO 20 SWA22790
19 CON=1.00 SWA22800
  IF(AAIJ.LT.-0.00001) CON=-1.00 SWA22810
  IF(AMIJ.LT.0.00001) GOTO 27 SWA22820
  VXC1=(CXMJ-CXM)*CON SWA22830
  AXX=(AX3(4)-AX3(5)+(AX4(5)-AX4(4))*C)*CON SWA22840
  GOTO 28 SWA22850
27 VXC1=0.00 SWA22860
  AXX=0.00 SWA22870
28 VXC2=CXPJ-CXP SWA22880
  VXS1=SXM-SXMJ SWA22890
  VXS2=SXP-SXPJ SWA22900
  WC1=-VXS1/CS*CON SWA22910
  WC2=-VXS2/CS SWA22920
  WS1=(CXMJ-CXM)/CS SWA22930
  WS2=VXC2/CS SWA22940

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VYC1=C*WC1
VYC2=C*WC2
VYS1=C*WS1
VYS2=C*WS2
APP=AP3(5)-AP3(4)-(AP4(5)-AP4(4))*C
BPP=BP3(5)-BP3(4)-(BP4(5)-BP4(4))*C
BXK=BK3(4)-BK3(5)+(BK4(5)-BK4(4))*C
BIJS=BIJ*BIJ
BJJS=BIJJ*BIJJ
AS=SQRT(AAIJ*AAIJ+BIJS)
ASJ=SQRT(AAIJJ*AAIJJ+BJJS)
BS=SQRT(ABIJ*ABIJ+BIJS)
BSJ=SQRT(ABIJJ*ABIJJ+BJJS)
CALL BEKM(AS,BKM,0)
BKA=BKM(1)
CALL BEKM(ASJ,BKM,0)
BKAJ=BKM(1)
CALL BEKM(BS,BKM,0)
BKB=BKM(1)
CALL BEKM(BSJ,BKM,0)
BKBJ=BKM(1)
Ayy=BKAJ-BKA-CC*(AP4(5)-AP4(4))+C*(AP3(5)-AP3(4))
Byy=BKBJ-BKB-CC*(BP4(5)-BP4(4))+C*(BP3(5)-BP3(4))
20 POTCEN(I,J)=((APP+BPP)/PHI-WC1-WC2)*U*SDXY
POTSEN(I,J)=(WS1+WS2)*U*SDXY
VELCEN(I,J)=(SNE(I)*((AXX+BXX)/PHI-VXC1-VXC2)-CSE(I))*((Ayy+Byy)
C/PHI-VYC1-VYC2))*U*SDXY
VELSEN(I,J)=(SNE(I)*(VXS1+VXS2)-CSE(I)*(VYS1+VYS2))*U*SDXY
POTCOD(I,J)=((APP-BPP)/PHI-WC1+WC2)*U*SDXY
POTSOD(I,J)=(WS1-WS2)*U*SDXY
VELCOD(I,J)=(SNE(I)*((AXX-BXX)/PHI-VXC1+VXC2)-CSE(I))*((Ayy-Byy)
C/PHI-VYC1+VYC2))*U*SDXY
VELSOD(I,J)=(SNE(I)*(VXS1-VXS2)-CSE(I)*(VYS1-VYS2))*U*SDXY
11 CONTINUE
RETURN
END
SUBROUTINE SOURCE
COMMON/SAM/X(31),Y(31),XX(30),YY(30),THY(30),SNE(30),CSE(30)
C,DUL(30),POTCEN(30,30),POTCOD(30,30),POTSEN(30,30),POTSOD(30,30)
C,VELCEN(30,30),VELCOD(30,30),VELSEN(30,30),VELSOD(30,30)
C,C,CC,NSEG,NPT,CS,PHI,HPH,TPH,NSET
COMMON/SOMA/VEVN(60,60),VODD(60,60),STEN(60,1),STOD(60,1)
COMMON/SAS/BKM(37)
DIMENSION R(4,2),AR(4),SPP(4),VX(4),BIM(37),VY(4)
RJ=0.00
DO 10 J=1,NSEG
JJ=J+1
TY=THY(J)
STJ=SNE(J)
CTJ=CSE(J)
RR=DUL(J)
IF(ABS(RR-RJ).LE.1.E-06) GOTO 30
RJ=RR
CALL BIMINT(RJ,BIM,36)
30 XJ=X(J)
XJJ=X(JJ)

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SWA22970  
SWA22980  
SWA22990  
SWA23000  
SWA23010  
SWA23020  
SWA23030  
SWA23040  
SWA23050  
SWA23060  
SWA23070  
SWA23080  
SWA23090  
SWA23100  
SWA23110  
SWA23120  
SWA23130  
SWA23140  
SWA23150  
SWA23160  
SWA23170  
SWA23180  
SWA23190  
SWA23200  
SWA23210  
SWA23220  
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SWA23240  
SWA23250  
SWA23260  
SWA23270  
SWA23280  
SWA23290  
SWA23300  
SWA23310  
SWA23320  
SWA23330  
SWA23340  
SWA23350  
SWA23360  
SWA23370  
SWA23380  
SWA23390  
SWA23400  
SWA23410  
SWA23420  
SWA23430  
SWA23440  
SWA23450  
SWA23460  
SWA23470  
SWA23480  
SWA23490  
SWA23500  
SWA23510  
SWA23520

YJ=Y(J)	SWA23530
YJJ=Y(JJ)	SWA23540
DO 10 I=1,NSEG	SWA23550
XI=XX(I)	SWA23560
YI=YY(I)	SWA23570
X1=XI-XJ	SWA23580
Y1=YI-YJ	SWA23590
Y2=YI+YJ	SWA23600
X3=XI+XJ	SWA23610
X11=X1*X1	SWA23620
X12=(X1-XJJ)**2	SWA23630
Y11=Y1*Y1	SWA23640
Y12=(Y1-YJJ)**2	SWA23650
Y21=Y2*Y2	SWA23660
Y22=(Y1+YJJ)**2	SWA23670
X31=X3*X3	SWA23680
X32=(X1+XJJ)**2	SWA23690
R(1,1)=SQRT(X11+Y11)	SWA23700
R(1,2)=SQRT(X12+Y12)	SWA23710
R(2,1)=SQRT(X11+Y21)	SWA23720
R(2,2)=SQRT(X12+Y22)	SWA23730
R(3,1)=SQRT(X31+Y11)	SWA23740
R(3,2)=SQRT(X32+Y12)	SWA23750
R(4,1)=SQRT(X31+Y21)	SWA23760
R(4,2)=SQRT(X32+Y22)	SWA23770
AR(1)=ATAN2(Y1,X1)-TY+HPH	SWA23780
AR(2)=ATAN2(Y2,X1)+TY-PHI-HPH	SWA23790
AR(3)=ATAN2(Y1,X3)+TY-HPH	SWA23800
AR(4)=ATAN2(Y2,X3)-TY-HPH	SWA23810
DO 13 K=1,4	SWA23820
ARK=AR(K)	SWA23830
TA=ARK-HPH	SWA23840
RK1=R(K,1)	SWA23850
RK2=R(K,2)	SWA23860
IF(K-1) 14,14,15	SWA23870
14 IF(I.EQ.J) GO TO 16	SWA23880
15 CA=COS(ARK)	SWA23890
IF(ABS(CA).LT.0.0050) GO TO 17	SWA23900
SA=SIN(ARK)	SWA23910
IF(RK1.LE.0.50.AND.RK2.LE.0.50) GO TO 18	SWA23920
CT=SA	SWA23930
RORK=RR/RK1	SWA23940
IF(RORK.LE.0.670) GOTO 25	SWA23950
CALL CORT(RK1,RK2,RR,CT,CA,SA,SP,SX,SY)	SWA23960
GOTO 19	SWA23970
25 M=MODER(RORK)	SWA23980
CALL BEKM(RK1,BKM,M)	SWA23990
CALL SORK(BKM,BIM,CT,RR,RK1,RORK,SP,SR,M)	SWA24000
SY1=BKM(1)	SWA24010
CALL BEKM(RK2,BKM,0)	SWA24020
SY=SY1-BKM(1)	SWA24030
SX=(SR-SA*SY)/CA	SWA24040
GOTO 19	SWA24050
16 RH=RR/2.0	SWA24060
CALL BKINTO(RH,SP)	SWA24070
SP=2.0*SP	SWA24080

SX=-PHI	SWA24090
SY=0.00000	SWA24100
GOTO 19	SWA24110
17 CALL BKINTO(RK1,SP1)	SWA24120
SY1=BKM(1)	SWA24130
CALL BKINTO(RK2,SP2)	SWA24140
SY=SY1-BKM(1)	SWA24150
SP=ABS(SP1-SP2)	SWA24160
SX=0.00000	SWA24170
GO TO 19	SWA24180
18 CALL APROX(RK1,RK2,RR,CA,SA,SP,SX,ARK)	SWA24190
CALL BEKM(RK1,BKM,0)	SWA24200
SY1=BKM(1)	SWA24210
CALL BEKM(RK2,BKM,0)	SWA24220
SY=SY1-BKM(1)	SWA24230
19 GO TO (20,21,22,23),K	SWA24240
20 CTHK=STJ	SWA24250
STHK=-CTJ	SWA24260
GOTO 24	SWA24270
21 CTHK=-STJ	SWA24280
STHK=-CTJ	SWA24290
GOTO 24	SWA24300
22 CTHK=STJ	SWA24310
STHK=CTJ	SWA24320
GOTO 24	SWA24330
23 CTHK=-STJ	SWA24340
STHK=CTJ	SWA24350
24 VX(K)=CTHK*SX-STHK*SY	SWA24360
VY(K)=STHK*SX+CTHK*SY	SWA24370
SPP(K)=SP	SWA24380
13 CONTINUE	SWA24390
VX12=(VX(1)-VX(2))/TPH	SWA24400
VX34=(VX(3)-VX(4))/TPH	SWA24410
VY12=(VY(1)-VY(2))/TPH	SWA24420
VY34=(VY(3)-VY(4))/TPH	SWA24430
SP12=(SPP(1)-SPP(2))/TPH	SWA24440
SP34=(SPP(3)-SPP(4))/TPH	SWA24450
POTCEN(I,J)=POTCEN(I,J)+SP12+SP34	SWA24460
POTCOD(I,J)=POTCOD(I,J)+SP12-SP34	SWA24470
VELCEN(I,J)=VELCEN(I,J)+SNE(I)*(VX12+VX34)-CSE(I)*(VY12+VY34)	SWA24480
VELCOD(I,J)=VELCOD(I,J)+SNE(I)*(VX12-VX34)-CSE(I)*(VY12-VY34)	SWA24490
VEVN(I,J)=VELCEN(I,J)	SWA24500
VODD(I,J)=VELCOD(I,J)	SWA24510
VEVN(I,J+NSEG)=-VELSEN(I,J)	SWA24520
VODD(I,J+NSEG)=-VELSOD(I,J)	SWA24530
VEVN(I+NSEG,J)=VELSEN(I,J)	SWA24540
VODD(I+NSEG,J)=VELSOD(I,J)	SWA24550
VEVN(I+NSEG,J+NSEG)=VELCEN(I,J)	SWA24560
VODD(I+NSEG,J+NSEG)=VELCOD(I,J)	SWA24570
10 CONTINUE	SWA24580
RETURN	SWA24590
END	SWA24600
SUBROUTINE PILON(AMJ,AMJJ,APJ,APJJ,BJ,BJJ,C,CC)	SWA24610
COMMON/AGFL/ AX3(5),AX4(5),AP2(5),AX1(5),AX2(5),AY3(5),AP3(5)	SWA24620
1,AP4(5),BX3(5),BX4(5),BP2(5),BX1(5),BX2(5),BY3(5),BP3(5),BP4(5)	SWA24630
2,XSQ(79),DFU(53),DFP(79)	SWA24640

3,DU,DH,IU,U,UU,H,HCU,AJS	SWA24650
DO 20 K=4,5	SWA24660
AP2(K)=0.00	SWA24670
BP2(K)=0.00	SWA24680
AX1(K)=0.00	SWA24690
BX1(K)=0.00	SWA24700
AX2(K)=0.00	SWA24710
BX2(K)=0.00	SWA24720
AY3(K)=0.00	SWA24730
BY3(K)=0.00	SWA24740
AP3(K)=0.00	SWA24750
BP3(K)=0.00	SWA24760
AP4(K)=0.00	SWA24770
20 BP4(K)=0.00	SWA24780
NZ=4	SWA24790
151 IF(NZ.EQ.5) GO TO 152	SWA24800
AM=AMJ	SWA24810
AP=APJ	SWA24820
B=BJ	SWA24830
GO TO 153	SWA24840
152 AM=AMJJ	SWA24850
AP=APJJ	SWA24860
B=BJJ	SWA24870
153 ITEST=2	SWA24880
IF(AM.GE.1.00) ITEST=0	SWA24890
IF(AM.LT.1.00.AND.AP.GE.1.00) ITEST=1	SWA24900
IAM=NUML(AM,AJS)	SWA24910
IAP=NUML(AP,AJS)	SWA24920
HAM=0.50*AM	SWA24930
HAP=0.50*AP	SWA24940
AMS=AM*AM/8.0	SWA24950
APS=AP*AP/8.0	SWA24960
AX3(3)=0.000000	SWA24970
AX4(3)=0.000000	SWA24980
AP2(3)=0.000000	SWA24990
AX1(3)=0.000000	SWA25000
AX2(3)=0.000000	SWA25010
AY3(3)=0.000000	SWA25020
AP3(3)=0.000000	SWA25030
AP4(3)=0.000000	SWA25040
BX3(3)=0.000000	SWA25050
BX4(3)=0.000000	SWA25060
BP2(3)=0.000000	SWA25070
BX1(3)=0.000000	SWA25080
BX2(3)=0.000000	SWA25090
BY3(3)=0.000000	SWA25100
BP3(3)=0.000000	SWA25110
BP4(3)=0.000000	SWA25120
IF(IAM-IAP) 133,134,135	SWA25130
133 ICH=0	SWA25140
IL=IAP	SWA25150
GO TO 136	SWA25160
134 ICH=1	SWA25170
IL=IAM	SWA25180
GO TO 136	SWA25190
135 ICH=2	SWA25200

	IL=IAM	SWA25210
136	DO 10 N=1,2	SWA25220
	X=0.000000	SWA25230
	DX=DU	SWA25240
	IUL=IU	SWA25250
	IF(N.EQ.1) GO TO 101	SWA25260
	X=1.000000	SWA25270
	DX=DH	SWA25280
	IUL=IL	SWA25290
101	TETA=B*DX	SWA25300
	CALL FPARA(TETA,ALPA,BETA,GAMA)	SWA25310
	FOAX3=0.000000	SWA25320
	FOAX4=0.000000	SWA25330
	FOAP2=0.000000	SWA25340
	FOAX1=0.000000	SWA25350
	FOAX2=0.000000	SWA25360
	FOAY3=0.000000	SWA25370
	FOAP3=0.000000	SWA25380
	FOAP4=0.000000	SWA25390
	FEAX3=0.000000	SWA25400
	FEAX4=0.000000	SWA25410
	FEAP2=0.000000	SWA25420
	FEAX1=0.000000	SWA25430
	FEAX2=0.000000	SWA25440
	FEAY3=0.000000	SWA25450
	FEAP3=0.000000	SWA25460
	FEAP4=0.000000	SWA25470
	FOBX3=0.000000	SWA25480
	FOBX4=0.000000	SWA25490
	FOBP2=0.000000	SWA25500
	FOBX1=0.000000	SWA25510
	FOBX2=0.000000	SWA25520
	FOBY3=0.000000	SWA25530
	FOBP3=0.000000	SWA25540
	FOBP4=0.000000	SWA25550
	FEBX3=0.000000	SWA25560
	FEBX4=0.000000	SWA25570
	FEBP2=0.000000	SWA25580
	FEBX1=0.000000	SWA25590
	FEBX2=0.000000	SWA25600
	FEBY3=0.000000	SWA25610
	FEBP3=0.000000	SWA25620
	FEBP4=0.000000	SWA25630
	DO 11 NN=1,IUL	SWA25640
	BX=B*X	SWA25650
	DC=COS(BX)	SWA25660
	DS=SIN(BX)	SWA25670
	XX=X*X	SWA25680
	IF(N.EQ.2) GO TO 102	SWA25690
	XS=SQRT(XX+1.0)	SWA25700
	FCU=DFU(NN)	SWA25710
	GO TO 103	SWA25720
102	XS=XSQ(NN)	SWA25730
	FCU=DFF(NN)	SWA25740
103	IF(AJS.GE.100.0) GO TO 104	SWA25750
	IF(N.EQ.2.AND.NN.GT.IAM) GO TO 105	SWA25760



EXAM=EXP(-AM*XS)/FCU	SWA25770
AAP2=X*EXAM	SWA25780
AAX2=AAP2*XS	SWA25790
AAX4=AAP2*X	SWA25800
AAX1=AAX4*XS	SWA25810
AAX3=AAX4*X	SWA25820
IF(AJS.LE.0.001) GO TO 105	SWA25830
AAP4=AAX4/XS	SWA25840
AAP3=AAP4*X	SWA25850
AAV3=AAP3*X	SWA25860
105 IF(N.EQ.2.AND.NN.GT.IAP) GO TO 106	SWA25870
EXAP=EXP(-AP*XS)/FCU	SWA25880
BBP2=EXAP*X	SWA25890
BBX2=BBP2*XS	SWA25900
BBX4=BBP2*X	SWA25910
BBX1=BBX4*XS	SWA25920
BBX3=BBX4*X	SWA25930
IF(AJS.LE.0.001) GO TO 106	SWA25940
BBP4=BBX4/XS	SWA25950
BBP3=BBP4*X	SWA25960
BBY3=BBP3*X	SWA25970
106 IF(ITEST.EQ.0) GO TO 107	SWA25980
IF(N.EQ.2.AND.NN.GT.IAM) GO TO 108	SWA25990
EAM=EXP(-AM*X)/FCU*X	SWA26000
DXA=X-HAM	SWA26010
DE=DXA*EAM	SWA26020
DM=DXA*X+AMS	SWA26030
AAP2=AAP2-EAM	SWA26040
AAX2=AAX2-DE	SWA26050
AAX4=AAX4-DE	SWA26060
AAX1=AAX1-EAM*(DM+0.50)	SWA26070
AAX3=AAX3-DE*X	SWA26080
IF(AJS.LE.0.001) GO TO 108	SWA26090
AAP4=AAP4-EAM	SWA26100
AAP3=AAP3-DE	SWA26110
AAV3=AAV3-EAM*(DM-0.50)	SWA26120
108 IF(ITEST.EQ.1) GO TO 107	SWA26130
IF(N.EQ.2.AND.NN.GT.IAP) GO TO 107	SWA26140
EAP=EXP(-AP*X)/FCU*X	SWA26150
DXA=X-HAP	SWA26160
DE=DXA*EAP	SWA26170
DM=DXA*X+APS	SWA26180
BBP2=BBP2-EAP	SWA26190
BBX2=BBX2-DE	SWA26200
BBX4=BBX4-DE	SWA26210
BBX1=BBX1-EAP*(DM+0.50)	SWA26220
BBX3=BBX3-DE*X	SWA26230
IF(AJS.LE.0.001) GO TO 107	SWA26240
BBP4=BBP4-EAP	SWA26250
BBP3=BBP3-DE	SWA26260
BBY3=BBY3-EAP*(DM-0.50)	SWA26270
GO TO 107	SWA26280
104 IF(N.EQ.2.AND.NN.GT.IAM) GO TO 109	SWA26290
EXAM=EXP(-AM*XS)/FCU	SWA26300
AAX4=EXAM	SWA26310
AAX3=AAX4*X	SWA26320

AAP4=AA4/XS	SWA26330
AAP3=AA3/XS	SWA26340
109 IF(N.EQ.2.AND.NN.GT.IAP) GO TO 110	SWA26350
EXAP=EXP(-AP*X)/FCU	SWA26360
BBX4=EXAP	SWA26370
BBX3=BBX4*X	SWA26380
BBP4=BBX4/XS	SWA26390
BBP3=BBX3/XS	SWA26400
110 IF(ITEST.EQ.0) GO TO 107	SWA26410
IF(N.EQ.2.AND.NN.GT.IAM) GO TO 111	SWA26420
EAM=EXP(-AM*X)/FCU	SWA26430
DUM=EAM*X/(XX+0.5000)	SWA26440
AAX4=AA4-EAM	SWA26450
AAX3=AA3-EAM*(X-HAM)	SWA26460
AAP4=AAP4-DUM	SWA26470
AAP3=AAP3-DUM*X	SWA26480
111 IF(ITEST.EQ.1) GO TO 107	SWA26490
IF(N.EQ.2.AND.NN.GT.IAP) GO TO 107	SWA26500
EAP=EXP(-AP*X)/FCU	SWA26510
DUM=EAP*X/(XX+0.5000)	SWA26520
BBX4=BBX4-EAP	SWA26530
BBX3=BBX3-EAP*(X-HAP)	SWA26540
BBP4=BBP4-DUM	SWA26550
BBP3=BBP3-DUM*X	SWA26560
107 NT=NN/2-(NN+1)/2	SWA26570
IF(NT) 112,113,113	SWA26580
112 IF(N.EQ.2.AND.NN.GT.IAM) GO TO 114	SWA26590
FOAX3=FOAX3+AA3*DS	SWA26600
FOAX4=FOAX4+AA4*DC	SWA26610
IF(AJS.GE.100.0) GO TO 115	SWA26620
FOAP2=FOAP2+AAP2*DS	SWA26630
FOAX1=FOAX1+AA1*DC	SWA26640
FOAX2=FOAX2+AA2*DS	SWA26650
IF(AJS.LE.0.001) GO TO 114	SWA26660
FOAY3=FOAY3+AA3*DC	SWA26670
115 FOAP3=FOAP3+AAP3*DS	SWA26680
FOAP4=FOAP4+AAP4*DC	SWA26690
114 IF(N.EQ.2.AND.NN.GT.IAP) GO TO 117	SWA26700
FOBX3=FOBX3+BBX3*DS	SWA26710
FOBX4=FOBX4+BBX4*DC	SWA26720
IF(AJS.GE.100.0) GO TO 116	SWA26730
FOBP2=FOBP2+BBP2*DS	SWA26740
FOBX1=FOBX1+BBX1*DC	SWA26750
FOBX2=FOBX2+BBX2*DS	SWA26760
IF(AJS.LE.0.001) GO TO 117	SWA26770
FOBY3=FOBY3+BBY3*DC	SWA26780
116 FOBP3=FOBP3+BBP3*DS	SWA26790
FOBP4=FOBP4+BBP4*DC	SWA26800
GO TO 117	SWA26810
113 IF(N.EQ.2.AND.NN.GT.IAM) GO TO 118	SWA26820
FEAX3=FEAX3+AA3*DS	SWA26830
FEAX4=FEAX4+AA4*DC	SWA26840
IF(AJS.GE.100.0) GO TO 119	SWA26850
FEAP2=FEAP2+AAP2*DS	SWA26860
FEAX1=FEAX1+AA1*DC	SWA26870
FEAX2=FEAX2+AA2*DS	SWA26880

IF(AJS.LE.0.001) GO TO 118	SWA26890
FEAY3=FEAY3+AA3*DC	SWA26900
119 FEAP3=FEAP3+AAP3*DS	SWA26910
FEAP4=FEAP4+AAP4*DC	SWA26920
118 IF(N.EQ.2.AND.NN.GT.IAP) GO TO 117	SWA26930
FEBX3=FEBX3+BBX3*DS	SWA26940
FEBX4=FEBX4+BBX4*DC	SWA26950
IF(AJS.GE.100.0) GO TO 120	SWA26960
FEBP2=FEBP2+BBP2*DS	SWA26970
FEBX1=FEBX1+BBX1*DC	SWA26980
FEBX2=FEBX2+BBX2*DS	SWA26990
IF(AJS.LE.0.001) GO TO 117	SWA27000
FEY3=FEY3+BBY3*DC	SWA27010
120 FEBP3=FEBP3+BBP3*DS	SWA27020
FEBP4=FEBP4+BBP4*DC	SWA27030
117 IF(NN-1) 121,121,122	SWA27040
121 FCAX3=AA3*DC	SWA27050
FSAX3=AA3*DS	SWA27060
FCAX4=AA4*DC	SWA27070
FSAX4=AA4*DS	SWA27080
FCBX3=BBX3*DC	SWA27090
FSBX3=BBX3*DS	SWA27100
FCBX4=BBX4*DC	SWA27110
FSEX4=BBX4*DS	SWA27120
IF(AJS.GE.100.0) GO TO 123	SWA27130
FCAP2=AAP2*DC	SWA27140
FSAP2=AAP2*DS	SWA27150
FCAX1=AA1*DC	SWA27160
FSAX1=AA1*DS	SWA27170
FCAX2=AA2*DC	SWA27180
FSAX2=AA2*DS	SWA27190
FCBP2=BBP2*DC	SWA27200
FSBP2=BBP2*DS	SWA27210
FCBX1=BBX1*DC	SWA27220
FSBX1=BBX1*DS	SWA27230
FCBX2=BBX2*DC	SWA27240
FSBX2=BBX2*DS	SWA27250
IF(AJS.LE.0.001) GO TO 11	SWA27260
FCAY3=AA3*DC	SWA27270
FSAY3=AA3*DS	SWA27280
FCBY3=BBY3*DC	SWA27290
FSBY3=BBY3*DS	SWA27300
123 FCAP3=AAP3*DC	SWA27310
FSAP3=AAP3*DS	SWA27320
FCAP4=AAP4*DC	SWA27330
FSAP4=AAP4*DS	SWA27340
FCBP3=BBP3*DC	SWA27350
FSBP3=BBP3*DS	SWA27360
FCBP4=BBP4*DC	SWA27370
FSEP4=BBP4*DS	SWA27380
GO TO 11	SWA27390
122 IF(N.EQ.1) GO TO 124	SWA27400
IF(ICH-1) 125,124,126	SWA27410
125 IF(NN.EQ.IAP) GO TO 127	SWA27420
IF(NN-IAM) 11,128,11	SWA27430
126 IF(NN.EQ.IAM) GO TO 128	SWA27440

	IF(NN-IAP) 11,127,11	SWA27450
124	IF(NN-IUL) 11,128,128	SWA27460
128	ECA3=AA3*DC	SWA27470
	ESA3=AA3*DS	SWA27480
	ECA4=AA4*DC	SWA27490
	ESA4=AA4*DS	SWA27500
	IF(AJS.GE.100.0) GO TO 129	SWA27510
	ECAP2=AAP2*DC	SWA27520
	ESAP2=AAP2*DS	SWA27530
	ECA1=AA1*DC	SWA27540
	ESA1=AA1*DS	SWA27550
	ECA2=AA2*DC	SWA27560
	ESA2=AA2*DS	SWA27570
	IF(AJS.LE.0.001) GO TO 130	SWA27580
	ECAY3=AA3*DC	SWA27590
	ESAY3=AA3*DS	SWA27600
129	ECAP3=AAP3*DC	SWA27610
	ESAP3=AAP3*DS	SWA27620
	ECAP4=AAP4*DC	SWA27630
	ESAP4=AAP4*DS	SWA27640
130	IF(N.EQ.1.OR.ICH.EQ.1) GO TO 127	SWA27650
	GO TO 11	SWA27660
127	ECB3=BB3*DC	SWA27670
	ESB3=BB3*DS	SWA27680
	ECB4=BB4*DC	SWA27690
	ESB4=BB4*DS	SWA27700
	IF(AJS.GE.100.0) GO TO 131	SWA27710
	ECBP2=BBP2*DC	SWA27720
	ESBP2=BBP2*DS	SWA27730
	ECB1=BB1*DC	SWA27740
	ESB1=BB1*DS	SWA27750
	ECB2=BB2*DC	SWA27760
	ESB2=BB2*DS	SWA27770
	IF(AJS.LE.0.001) GO TO 11	SWA27780
	ECBY3=BB3*DC	SWA27790
	ESBY3=BB3*DS	SWA27800
131	ECBP3=BBP3*DC	SWA27810
	ESBP3=BBP3*DS	SWA27820
	ECBP4=BBP4*DC	SWA27830
	ESBP4=BBP4*DS	SWA27840
11	X=X+DX	SWA27850
	FOA3=FOA3-(ESA3+FSAX3)/2.	SWA27860
	FOB3=FOB3-(ESB3+FSBX3)/2.	SWA27870
	FOA4=FOA4-(ECA4+FCAX4)/2.	SWA27880
	FOB4=FOB4-(ECB4+FCBX4)/2.	SWA27890
	AX3(N)=DX*(ALPA*(FCA3-ECA3)+BETA*FOA3+GAMA*FEAX3)	SWA27900
	BX3(N)=DX*(ALPA*(FCB3-ECB3)+BETA*FOB3+GAMA*FEBX3)	SWA27910
	AX4(N)=DX*(ALPA*(ESA4-FSAX4)+BETA*FOA4+GAMA*FEAX4)	SWA27920
	BX4(N)=DX*(ALPA*(ESB4-FSBX4)+BETA*FOB4+GAMA*FEBX4)	SWA27930
	IF(AJS.GE.100.0) GO TO 140	SWA27940
	FOAP2=FOAP2-(ESAP2+FSAP2)/2.	SWA27950
	FOBP2=FOBP2-(ESBP2+FSBP2)/2.	SWA27960
	FOA1=FOA1-(ECA1+FCAX1)/2.	SWA27970
	FOB1=FOB1-(ECB1+FCBX1)/2.	SWA27980
	FOA2=FOA2-(ESA2+FSAX2)/2.	SWA27990
	FOB2=FOB2-(ESB2+FSBX2)/2.	SWA28000

AP2(N)=DX*(ALPA*(FCAP2-ECAP2)+BETA*FOAP2+GAMA*FEAP2)	SWA28010
BP2(N)=DX*(ALPA*(FCBP2-ECBP2)+BETA*FOBP2+GAMA*FEBP2)	SWA28020
AX1(N)=DX*(ALPA*(ESAX1-FSAX1)+BETA*FOAX1+GAMA*FEAX1)	SWA28030
BX1(N)=DX*(ALPA*(ESBX1-FSBX1)+BETA*FOBX1+GAMA*FEBX1)	SWA28040
AX2(N)=DX*(ALPA*(FCAX2-ECAX2)+BETA*FOAX2+GAMA*FEAX2)	SWA28050
BX2(N)=DX*(ALPA*(FCBX2-ECBX2)+BETA*FOBX2+GAMA*FEBX2)	SWA28060
IF(AJS.LE.0.001) GO TO 10	SWA28070
FOAY3=FOAY3-(ECAY3+FCAY3)/2.	SWA28080
FOBY3=FOBY3-(ECBY3+FCBY3)/2.	SWA28090
AY3(N)=DX*(ALPA*(ESAY3-FSAY3)+BETA*FOAY3+GAMA*FEAY3)	SWA28100
BY3(N)=DX*(ALPA*(ESBY3-FSBY3)+BETA*FOBY3+GAMA*FEBY3)	SWA28110
140 FOAP3=FOAP3-(ESAP3+FSAP3)/2.	SWA28120
FOBP3=FOBP3-(ESBP3+FSBP3)/2.	SWA28130
FOAP4=FOAP4-(ECAP4+FCAP4)/2.	SWA28140
FOBP4=FOBP4-(ECBP4+FCBP4)/2.	SWA28150
AP3(N)=DX*(ALPA*(FCAP3-ECAP3)+BETA*FOAP3+GAMA*FEAP3)	SWA28160
BP3(N)=DX*(ALPA*(FCBP3-ECBP3)+BETA*FOBP3+GAMA*FEBP3)	SWA28170
AP4(N)=DX*(ALPA*(ESAP4-FSAP4)+BETA*FOAP4+GAMA*FEAP4)	SWA28180
BP4(N)=DX*(ALPA*(ESBP4-FSBP4)+BETA*FOBP4+GAMA*FEBP4)	SWA28190
10 CONTINUE	SWA28200
IF(ITEST-1) 142,143,143	SWA28210
143 CALL EXPINT(AM,B,C,RMCP,RMCM,AMCP,AMCM)	SWA28220
IF(ITEST.EQ.1) GO TO 144	SWA28230
CALL EXPINT(AP,B,C,RPCP,RPCM,APCP,APCM)	SWA28240
144 IF(AJS.GE.100.0) GO TO 145	SWA28250
CALL EXPINT(AM,B,U,RMUP,RMUM,AMUP,AMUM)	SWA28260
IF(ITEST.EQ.1) GO TO 146	SWA28270
CALL EXPINT(AP,B,U,RPUP,RPUM,APUP,APUM)	SWA28280
146 CM1=HCU*(RMUM+RMUP-RMCM-RMCP)	SWA28290
SM1=HCU*(AMUM+AMUP-AMCM-AMCP)	SWA28300
CM2=HCU*(C*(AMCM-AMCP)+U*(AMUP-AMUM))	SWA28310
SM2=HCU*(C*(RMCP-RMCM)+U*(RMUM-RMUP))	SWA28320
CM3=HCU*(CC*(RMCM+RMCP)-UU*(RMUM+RMUP))	SWA28330
SM3=HCU*(CC*(AMCM+AMCP)-UU*(AMUM+AMUP))	SWA28340
AX3(3)=SM3-HAM*SM2	SWA28350
AX4(3)=CM2-HAM*CM1	SWA28360
AP2(3)=SM1	SWA28370
AX1(3)=CM3-HAM*CM2+(0.50+AMS)*CM1	SWA28380
AX2(3)=SM2-HAM*SM1	SWA28390
IF(AJS.LE.0.001) GO TO 147	SWA28400
AY3(3)=CM3-HAM*CM2+(AMS-0.50)*CM1	SWA28410
AP3(3)=SM2-HAM*SM1	SWA28420
AP4(3)=CM1	SWA28430
147 IF(ITEST.EQ.1) GO TO 142	SWA28440
CP1=HCU*(RPUM+RPUP-RPCM-RPCP)	SWA28450
SP1=HCU*(APUM+APUP-APCM-APCP)	SWA28460
CP2=HCU*(C*(APCM-APCP)+U*(APUP-APUM))	SWA28470
SP2=HCU*(C*(RPCP-RPCM)+U*(RPUM-RPUP))	SWA28480
CP3=HCU*(CC*(RPCM+RPCP)-UU*(RPUM+RPUP))	SWA28490
SP3=HCU*(CC*(APCM+APCP)-UU*(APUM+APUP))	SWA28500
BX3(3)=SP3-HAP*SP2	SWA28510
BX4(3)=CP2-HAP*CP1	SWA28520
BP2(3)=SP1	SWA28530
BX1(3)=CP3-HAP*CP2+(0.50+APS)*CP1	SWA28540
BX2(3)=SP2-HAP*SP1	SWA28550
IF(AJS.LE.0.001) GO TO 142	SWA28560

BY3(3)=CP3-HAP*CP2+(APS-0.50)*CP1	SWA28570
BP3(3)=SP2-HAP*SP1	SWA28580
BP4(3)=CP1	SWA28590
GO TO 142	SWA28600
145 CALL EXPINT(AM,B,H, RMHP, RMHM, AMHP, AMHM)	SWA28610
IF(ITEST.EQ.1) GO TO 148	SWA28620
CALL EXPINT(AP,B,H, RPHP, RPHM, APHP, APHM)	SWA28630
148 AX3(3)=0.50*(AMCM+AMCP)-0.25*AM*(RMCP-RMCM)/C	SWA28640
AX4(3)=0.50*(AMCM-AMCP)/C	SWA28650
AP3(3)=0.50*(C*(RMCP-RMCM)+H*(RMHM-RMHP))/(CC-0.50)	SWA28660
AP4(3)=0.50*(RMHM+RMHP-RMCM-RMCP)/(CC-0.50)	SWA28670
IF(ITEST.EQ.1) GO TO 142	SWA28680
EX3(3)=0.50*(APCM+APCP)-0.25*AP*(RPCP-RPCM)/C	SWA28690
EX4(3)=0.50*(APCM-APCP)/C	SWA28700
BP3(3)=0.50*(C*(RPCP-RPCM)+H*(RPHM-RPHP))/(CC-0.50)	SWA28710
BP4(3)=0.50*(RPHM+RPHP-RPCM-RPCP)/(CC-0.50)	SWA28720
142 AX3(NZ)=AX3(1)+AX3(2)+AX3(3)	SWA28730
AX4(NZ)=AX4(1)+AX4(2)+AX4(3)	SWA28740
BX3(NZ)=BX3(1)+BX3(2)+BX3(3)	SWA28750
BX4(NZ)=BX4(1)+BX4(2)+BX4(3)	SWA28760
IF(AJS.GE.100.0) GO TO 149	SWA28770
AP2(NZ)=AP2(1)+AP2(2)+AP2(3)	SWA28780
AX1(NZ)=AX1(1)+AX1(2)+AX1(3)	SWA28790
AX2(NZ)=AX2(1)+AX2(2)+AX2(3)	SWA28800
BP2(NZ)=BP2(1)+BP2(2)+BP2(3)	SWA28810
BX1(NZ)=BX1(1)+BX1(2)+BX1(3)	SWA28820
BX2(NZ)=BX2(1)+BX2(2)+BX2(3)	SWA28830
IF(AJS.LE.0.001) GO TO 150	SWA28840
AY3(NZ)=AY3(1)+AY3(2)+AY3(3)	SWA28850
BY3(NZ)=BY3(1)+BY3(2)+BY3(3)	SWA28860
149 AP3(NZ)=AP3(1)+AP3(2)+AP3(3)	SWA28870
AP4(NZ)=AP4(1)+AP4(2)+AP4(3)	SWA28880
BP3(NZ)=BP3(1)+BP3(2)+BP3(3)	SWA28890
BP4(NZ)=BP4(1)+BP4(2)+BP4(3)	SWA28900
150 IF(NZ.EQ.5) GO TO 154	SWA28910
NZ=5	SWA28920
GO TO 151	SWA28930
154 RETURN	SWA28940
END	SWA28950
SUBROUTINE FPARA(TETA,ALPA,BETA,GAMA)	SWA28960
TS=TETA*TETA	SWA28970
TT=TETA*TS	SWA28980
IF(TETA.LE.0.1666667) GO TO 10	SWA28990
S=SIN(TETA)	SWA29000
C=COS(TETA)	SWA29010
SS=SIN(2.*TETA)	SWA29020
ALPA=1./TETA+SS/2./TS-2.*S*S/TT	SWA29030
BETA=(1.00000+C*C)/TS-SS/TT	SWA29040
BETA=BETA*2.	SWA29050
GAMA=S/TT-C/TS	SWA29060
GAMA=GAMA*4.	SWA29070
GO TO 11	SWA29080
10 T4=TETA*TT	SWA29090
T5=TS*TT	SWA29100
T6=TT*TT	SWA29110
T7=TT*T4	SWA29120

T8=T4*T4	SWA29130
ALPA=2.*TT/45.-2.*T5/315.+2.*T7/4725.	SWA29140
BETA=2./3.+2.*TS/15.-4.*T4/105.+2.*T6/567.-4.*T8/22275.	SWA29150
GAMA=4./3.-2.*TS/15.+T4/210.-T6/11340.	SWA29160
11 RETURN	SWA29170
END	SWA29180
FUNCTION NUML(A,AJS)	SWA29190
IF(A-1.00) 2,3,3	SWA29200
2 IF(AJS.GE.100.0) GO TO 4	SWA29210
IF(A-0.20) 6,5,5	SWA29220
5 NUML=31	SWA29230
IF(A.LT.0.80) NUML=37	SWA29240
IF(A.LT.0.50) NUML=45	SWA29250
IF(A.LT.0.30) NUML=51	SWA29260
GO TO 1	SWA29270
6 NUML=59	SWA29280
IF(A.LT.0.10) NUML=63	SWA29290
IF(A.LT.0.06) NUML=71	SWA29300
IF(A.LT.0.02) NUML=79	SWA29310
GO TO 1	SWA29320
4 IF(A-0.20) 8,7,7	SWA29330
7 NUML=31	SWA29340
IF(A.LT.0.60) NUML=39	SWA29350
IF(A.LT.0.40) NUML=45	SWA29360
IF(A.LT.0.30) NUML=51	SWA29370
GO TO 1	SWA29380
8 NUML=57	SWA29390
IF(A.LE.0.04) NUML=51	SWA29400
IF(A.LE.0.02) NUML=41	SWA29410
IF(A.LE.0.01) NUML=31	SWA29420
GO TO 1	SWA29430
3 NUML=3	SWA29440
IF(A.LT.8.00) NUML=9	SWA29450
IF(A.LT.4.00) NUML=13	SWA29460
IF(A.LT.3.00) NUML=21	SWA29470
IF(A.LT.2.00) NUML=35	SWA29480
IF(A.LT.1.26) NUML=47	SWA29490
1 RETURN	SWA29500
END	SWA29510
FUNCTION NUMU(U)	SWA29520
IF(U-0.25) 3,2,2	SWA29530
2 NUMU=11	SWA29540
IF(U.LT.0.80) NUMU=13	SWA29550
IF(U.LT.0.70) NUMU=15	SWA29560
IF(U.LT.0.50) NUMU=19	SWA29570
IF(U.LT.0.40) NUMU=23	SWA29580
IF(U.LT.0.30) NUMU=25	SWA29590
GO TO 1	SWA29600
3 NUMU=29	SWA29610
IF(U.LT.0.20) NUMU=31	SWA29620
IF(U.LT.0.18) NUMU=35	SWA29630
IF(U.LT.0.16) NUMU=39	SWA29640
IF(U.LT.0.14) NUMU=45	SWA29650
IF(U.LT.0.12) NUMU=53	SWA29660
1 RETURN	SWA29670
END	SWA29680

SUBROUTINE EXPINT(YA,XB,Q,RP,RM,AP,AM)	SWA29690
IMPLICIT REAL*8(D)	SWA29700
REAL*4 D(5),F(5)	SWA29710
F(1)=.52175561	SWA29720
F(2)=.398666681	SWA29730
F(3)=.7594245E-01	SWA29740
F(4)=.3611759E-02	SWA29750
F(5)=.2336997E-04	SWA29760
D(1)=.26356032	SWA29770
D(2)=1.4134031	SWA29780
D(3)=3.5964258	SWA29790
D(4)=7.0858100	SWA29800
D(5)=12.640801	SWA29810
I=1	SWA29820
X=Q*XB	SWA29830
Y=Q*YA	SWA29840
57 IF(1.EQ.1) GO TO 55	SWA29850
X=-X	SWA29860
Y=-Y	SWA29870
55 SR=0.0	SWA29880
SI=0.	SWA29890
N=0	SWA29900
TEST=0.00001	SWA29910
AY=ABS(Y)	SWA29920
YY=Y*Y	SWA29930
R=X*X+Y*Y	SWA29940
IF(X.GE. 0.0 .AND.R .GE.25.) GO TO 10	SWA29950
IF(X.LT. 0.0 .AND.AY.GE. 5.) GO TO 10	SWA29960
IF(X.LE.-13.0.AND.AY.LT.5.) GO TO 11	SWA29970
E=EXP(X)	SWA29980
C=COS(Y)	SWA29990
S=SIN(Y)	SWA30000
EC=E*C	SWA30010
ES=E*S	SWA30020
IF(X.LE.2.0) GO TO 12	SWA30030
DX=DBLE(X)	SWA30040
DY=DBLE(Y)	SWA30050
DR=DBLE(R)	SWA30060
DAL=.5*DLOG(DR)	SWA30070
DAT=DATAN2(DY,DX)	SWA30080
DSR=-.5772156649-DAL+DX	SWA30090
DSI=-DAT+DY	SWA30100
DA=DX	SWA30110
DB=DY	SWA30120
GO TO 6	SWA30130
12 AT=ATAN2(Y,X)	SWA30140
AL=.5*ALOG(R)	SWA30150
SR=-.57721566-AL+X	SWA30160
SI=-AT+Y	SWA30170
A=X	SWA30180
B=Y	SWA30190
IF(X.GE.0.0) GO TO 6	SWA30200
RS=SQRT(R)	SWA30210
NR=IFIX(RS)	SWA30220
6 TEST=TEST/E/10.	SWA30230
IF(X.LE.2.0) GO TO 2	SWA30240



DO 13 N=1,50	SWA30250
DN=DFLOAT(N)	SWA30260
DNN=DN+1.	SWA30270
DCN=-DN/DNN/DNN	SWA30280
DAC=DA	SWA30290
DBC=DB	SWA30300
DA=DCN*(DAC*DX-DBC*DY)	SWA30310
DB=DCN*(DAC*DY+DBC*DX)	SWA30320
DSR=DSR+DA	SWA30330
DSI=DSI+DB	SWA30340
A=DA	SWA30350
B=DB	SWA30360
IF(ABS(A).LE.TEST.AND.ABS(B).LE.TEST) GO TO 14	SWA30370
13 CONTINUE	SWA30380
14 DSP=DSR	SWA30390
DSR=EC*DSR-ES*DSI	SWA30400
DSI=EC*DSI+ES*DSP	SWA30410
SR=DSR	SWA30420
SI=DSI	SWA30430
GO TO 99	SWA30440
2 DO 1 N=1,50	SWA30450
NN=N+1	SWA30460
CN=-N	SWA30470
CN=CN/NN/NN	SWA30480
AC=A	SWA30490
BC=B	SWA30500
A=CN*(AC*X-BC*Y)	SWA30510
B=CN*(AC*Y+BC*X)	SWA30520
SR=SR+A	SWA30530
SI=SI+B	SWA30540
IF(X.GE.0.0) GO TO 7	SWA30550
IF(N.LT.NR) GO TO 1	SWA30560
7 IF(ABS(A).LE.TEST.AND.ABS(B).LE.TEST) GO TO 3	SWA30570
1 CONTINUE	SWA30580
3 SP=SR	SWA30590
SR=EC*SR-ES*SI	SWA30600
SI=EC*SI+ES*SP	SWA30610
GO TO 99	SWA30620
10 DO 4 I=1,5	SWA30630
FF=X+D(I)	SWA30640
FD=FF*FF	SWA30650
FD=FD+YY	SWA30660
FI=F(I)/FD	SWA30670
SR=SR+FI*FF	SWA30680
4 SI=SI-FI*Y	SWA30690
GO TO 99	SWA30700
11 XR=X/R	SWA30710
YR=Y/R	SWA30720
A=XR	SWA30730
B=-YR	SWA30740
SR=A	SWA30750
SI=B	SWA30760
DO 5 N=1,14	SWA30770
AC=A	SWA30780
BC=B	SWA30790
A=(-N)*(AC*XR+BC*YR)	SWA30800

B=(-N)*(BC*XR-AC*YR)	SWA30810
SR=SR+A	SWA30820
SI=SI+B	SWA30830
IF (ABS(A).LE.TEST.AND.ABS(B).LE.TEST) GO TO 99	SWA30840
5 CONTINUE	SWA30850
99 IF(I.EQ.2) GO TO 56	SWA30860
RP=SR	SWA30870
AP=SI	SWA30880
I=2	SWA30890
GO TO 57	SWA30900
56 RM=SR	SWA30910
AM=SI	SWA30920
RETURN	SWA30930
END	SWA30940
SUBROUTINE BEKM(X,BKM,M)	SWA30950
DIMENSION T(12),BKM(1)	SWA30960
IF(X-1.)36,36,25	SWA30970
25 A=EXP(-X)	SWA30980
B=1./X	SWA30990
C=SQRT(B)	SWA31000
T(1)=B	SWA31010
DO 26 L=2,12	SWA31020
26 T(L)=T(L-1)*B	SWA31030
27 GO=A*(1.2533141-.1566642*T(1)+.08811128*T(2)-.09139095*T(3)	SWA31040
2+.1344596*T(4)-.2299850*T(5)+.3792410*T(6)-.5247277*T(7)	SWA31050
3+.5575368*T(8)-.4262633*T(9)+.2184518*T(10)-.06680977*T(11)	SWA31060
4+.009189383*T(12))*C	SWA31070
BKM(1)=GO	SWA31080
IF(M) 55,55,29	SWA31090
29 G1=A*(1.2533141+.4699927*T(1)-.1468583*T(2)+.1280427*T(3)	SWA31100
2-.1736432*T(4)+.2847618*T(5)-.4594342*T(6)+.6283381*T(7)	SWA31110
3-.6632295*T(8)+.5050239*T(9)-.2581304*T(10)+.07880001*T(11)	SWA31120
4-.01082418*T(12))*C	SWA31130
BKM(2)=G1	SWA31140
IF(M-1) 55,55,31	SWA31150
36 B=X/2.	SWA31160
A=.5772157+ALOG(B)	SWA31170
C=B*B	SWA31180
37 GO=-A	SWA31190
X2J=1.	SWA31200
FACT=1.	SWA31210
HJ=.0	SWA31220
DO 40 J=1,6	SWA31230
RJ=1./FLOAT(J)	SWA31240
X2J=X2J*C	SWA31250
FACT=FACT*RJ*RJ	SWA31260
HJ=HJ+RJ	SWA31270
40 GO=GO+X2J*FACT*(HJ-A)	SWA31280
BKM(1)=GO	SWA31290
IF(M) 55,55,43	SWA31300
43 X2J=B	SWA31310
FACT=1.	SWA31320
HJ=1.	SWA31330
G1=1./X+X2J*(.5+A-HJ)	SWA31340
DO 50 J=2,8	SWA31350
X2J=X2J*C	SWA31360

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RJ=1./FLOAT(J)
FACT=FACT*RJ*RJ
HJ=HJ+RJ
50 G1=G1+X2J*FACT*(.5+(A-HJ)*FLOAT(J))
BKM(2)=G1
IF(M-1) 55,55,31
31 GG1=G1*X/2.
GGO=GO
MP=M+1
DO 35 J=2,MP
JP=J-1
GGJ=GG1*JP/J+GGO*X*X/4./J/JP
BKM(J+1)=GGJ
GGO=GG1
35 GG1=GGJ
55 RETURN
END
SUBROUTINE CORT(RK1,RK2,RR,CT,CA,SA,SP,SX,SY)
COMMON/SAS/BKM(37)
DIMENSION BMD(37)
MC=0
XK=RK1*CA
YK=RK1*SA
XKS=XK*XK
SX=0.0
SY=0.0
SP=0.0
DO 26 KD=1,10
IF(MC.EQ.1) GOTO 34
IF(KD-1) 27,27,28
27 RD=0.670*RK1
RRD=RD
RD1=RK1
YKD=YK-RD
RD2=SQRT(XKS+YKD*YKD)
CD=CT
CAD=CA
SAD=SA
RORD=0.670
MD=35
GOTO 29
28 RD=0.670*RD2
RD1=RD2
ARD=ATAN2(YKD,XK)
CAD=COS(ARD)
SAD=SIN(ARD)
CD=SAD
RRD=RRD+RD
IF(RRD.GE.RR) GOTO 30
YKD=YKD-RD
RD2=SQRT(XKS+YKD*YKD)
GOTO 31
30 RD2=RK2
MC=1
RD=RD+RR-RRD
31 RORD=RD/RD1
SWA31370
SWA31380
SWA31390
SWA31400
SWA31410
SWA31420
SWA31430
SWA31440
SWA31450
SWA31460
SWA31470
SWA31480
SWA31490
SWA31500
SWA31510
SWA31520
SWA31530
SWA31540
SWA31550
SWA31560
SWA31570
SWA31580
SWA31590
SWA31600
SWA31610
SWA31620
SWA31630
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SWA31790
SWA31800
SWA31810
SWA31820
SWA31830
SWA31840
SWA31850
SWA31860
SWA31870
SWA31880
SWA31890
SWA31900
SWA31910
SWA31920

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MD=MODER(RORD)
29 IF(RD1.LE.0.50.AND.RD2.LE.0.50) GOTO 32
CALL BIMINT(RD,BIM,MD)
CALL BEKM(RD1,BKM,MD)
CALL SORK(BKM,BIM,CD,RD,RD1,RORD,SPD,SRD,MD)
SYD1=BKM(1)
CALL BEKM(RD2,BKM,0)
SYD=SYD1-BKM(1)
SXD=(SRD-SAD*SYD)/CAD
GOTO 33
32 CALL APROX(RD1,RD2,RD,CAD,SAD,SPD,SXD,ARD)
CALL BEKM(RD1,BKM,0)
SYD1=BKM(1)
CALL BEKM(RD2,BKM,0)
SYD=SYD1-BKM(1)
33 SX=SX+SXD
SY=SY+SYD
26 SP=SP+SPD
34 RETURN
END
SUBROUTINE SORK(BKM,BIM,CTA,RHO,R,ROR,SP,SR,M)
DIMENSION BKM(1),BIM(1)
CT2=2.0*CTA*CTA-1.000000
RORS=ROR*ROR
RS=R*R
SP=BKM(1)*BIM(1)+BKM(2)*BIM(2)*RHO*CTA+2.*RORS*BKM(3)*BIM(3)*CT2
SR=-BKM(2)*BIM(1)-(BKM(1)+BKM(3)*8./RS)*BIM(2)*RHO/2.*CTA-
C(BKM(2)+BKM(4)*48./RS/R)*BIM(3)*RHO*RHO/8.*CT2
CT1=CTA
DO 10 I=3,M
II=I+1
RORS=RORS*ROR
CTI=2.0*CT2*CTA-CT1
DM=RORS*BIM(II)
DP=DM*BKM(II)*2.0
DR=DM*(BKM(I)*R/I/2.+BKM(II+1)*2.*II/R)
SP=SP+DP*CTI
SR=SR-DR*CTI
CT1=CT2
10 CT2=CTI
11 RETURN
END
SUBROUTINE APROX(R1,R2,RR,CA,SA,SP,SX,AR)
ALP=1.562519E-02
BET=.2789828
GAM=2.524915E-02
TET=.1159315
XI=R1*CA
YI=R1*SA
YIJ=YI-RR
AT12=ATAN(YI/XI)-ATAN(YIJ/XI)
XS=XI*XI
XT=XS*XI
X4=XS*XS
YS=YI*YI
YT=YS*YI

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SWA31930
SWA31940
SWA31950
SWA31960
SWA31970
SWA31980
SWA31990
SWA32000
SWA32010
SWA32020
SWA32030
SWA32040
SWA32050
SWA32060
SWA32070
SWA32080
SWA32090
SWA32100
SWA32110
SWA32120
SWA32130
SWA32140
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SWA32290
SWA32300
SWA32310
SWA32320
SWA32330
SWA32340
SWA32350
SWA32360
SWA32370
SWA32380
SWA32390
SWA32400
SWA32410
SWA32420
SWA32430
SWA32440
SWA32450
SWA32460
SWA32470
SWA32480

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YF=YT*YS
YJS=YIJ*YIJ
YJT=YJS*YIJ
YJF=YJT*YJS
DY3=(YT-YJT)/3.
DY5=(YF-YJF)/5.
AL1=ALOG(R1)
AL2=ALOG(R2)
XRY=XS*RR+DY3
F1=YI*AL1-YIJ*AL2-RR*XI*AT12
F2=(YT*AL1-YJT*AL2-DY3+XS*RR-XT*AT12)/3.
F4=(YF*AL1-YJF*AL2-2.*DY5+2.*XS*DY3-2.*X4*RR+2.*XT*XS*AT12)/10.
SP=F1*(-1.00-0.250*XS-ALP*X4)-F2*(0.250+2.00*ALP*XS)-ALP*F4+BET
C*XRY+GAM*(X4*RR+2.0*XS*DY3+DY5)+TET*RR
SX=F1*XI*(-.50-4.0*ALP*XS)-4.0*ALP*XI*F2+8.537141E-02*XI*XRY
C+.3079656*XI*RR-AT12
RETURN
END
SUBROUTINE BIMINT(X,BIM,M)
DIMENSION BIM(1)
MP=M+1
X1=X
X2=X*X
X3=X2*X
X5=X3*X2
X7=X5*X2
X9=X7*X2
P1=1.00000
P2=2.00000
P3=3.00000
P4=4.00000
P5=5.00000
P7=7.00000
P9=9.00000
DO 10 I=1,MP
P12=P1*P2
P13=P12*P3
P14=P13*P4
BIM(I)=X1/P1+X3/P1/P3/4.+X5/P12/P5/32.+X7/P13/P7/384.+X9/P14/P9/
C6144.
P1=P1+1.000000
P2=P2+1.000000
P3=P3+1.000000
P4=P4+1.000000
P5=P5+1.000000
P7=P7+1.000000
10 P9=P9+1.000000
RETURN
END
SUBROUTINE BKINTO(X,ANS)
COMMON/SAS/BKM(37)
TEST=1.E-08
XS=X*X
FX=X
GX=XS
DX=X

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SWA32490
SWA32500
SWA32510
SWA32520
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SWA32570
SWA32580
SWA32590
SWA32600
SWA32610
SWA32620
SWA32630
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SWA32670
SWA32680
SWA32690
SWA32700
SWA32710
SWA32720
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SWA32970
SWA32980
SWA32990
SWA33000
SWA33010
SWA33020
SWA33030
SWA33040

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DO 10 I=3,51,2
DX=DX*XS/I/I
DG=DX*X
DF=DX*I
IF(DF.LT.TEST.AND.DG.LT.TEST) GO TO 11
FX=FX+DF
10 GX=GX+DG
11 CALL BEKM(X,BKM,1)
ANS=FX*BKM(1)+GX*BKM(2)
RETURN
END
FUNCTION MODER(ROR)
TEST=-13.82/ALOG(ROR)
MODER=IFIX(TEST)+1
IF(MODER.LT.4) MODER=4
RETURN
END
COMPLEX FUNCTION WTRAP(DX,Y,N,M)
COMPLEX Y
DIMENSION DX(1),Y(1)
WTRAP=(0.,0.)
N1=N-1
IF(M.EQ.1) GO TO 20
DO 10 I=2,N1
10 WTRAP=WTRAP+Y(I)
WTRAP=DX(1)*(0.5*(Y(1)+Y(N))+WTRAP)
RETURN
20 DO 30 I=1,N1
30 WTRAP=WTRAP+DX(I)*(Y(I)+Y(I+1))
WTRAP=0.5*WTRAP
RETURN
END
SUBROUTINE FSWRY(F,RHO,ZETAA,F2,F4,H2,H4,DMN,RTO,XI,DX,NSTA,NSP)
COMPLEX F(6),F2(27),H2(27),F4(27),H4(27),ZRT,X,WTRAP,CMLX
COMMON ZRT,X(27),GZ
DIMENSION XI(27),DX(27)
ZRT=CMLX(0.,-RTO)
GZ=RHO*ZETAA/DMN
DO 10 I=1,NSTA
10 X(I)=F4(I)+H4(I)
F(4)=GZ*(WTRAP(DX,X,NSTA,NSP)+ZRT*H4(NSTA))
DO 20 I=1,NSTA
20 X(I)=F2(I)+H2(I)
F(2)=GZ*(WTRAP(DX,X,NSTA,NSP)+ZRT*H2(NSTA))
DO 30 I=1,NSTA
30 X(I)=X(I)*XI(I)+ZRT*H2(I)
F(6)=GZ*(WTRAP(DX,X,NSTA,NSP)+ZRT*H2(NSTA)*XI(NSTA))
RETURN
END

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SWA33050  
SWA33060  
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SWA33200  
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SWA33380  
SWA33390  
SWA33400  
SWA33410  
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SWA33430  
SWA33440  
SWA33450  
SWA33460  
SWA33470  
SWA33480  
SWA33490  
SWA33500  
SWA33510  
SWA33520  
SWA33530

#### 4. SAMPLE INPUT/OUTPUT

SWATH1 DATA A



SWATH IV MODEL 5287 AT 28 FT DRAFT  
 HEAD REGULAR WAVES AT 14 FREQUENCIES  
 NEW PROGRAM WITH NEW APPROXIMATE INTEGRALS  
 SEPTEMBER 23, 1984 ( WITH A33 AND B33 PRINTOUTS)

13	1	1	1	1	0	1	668.938	624.924
14	1	1	1	1	0	1	668.938	624.924
1.000E-06	32.234	310.724	506.352	617.866	668.938	624.924		
515.654	354.110	236.996	165.676	12.140				
0.4781E+00	287.6E+00	36.E+00	28.E+00	1.932E+00	32174E+02	0.E+00	3.23E+00	
1.E+0067.001E+00	37.5E+00	0.E+0067.001E+00	7.99E+00	7.99E+00	0.E+00	0.E+00	0.E+00	
0.E+00	37.5E+00	3.23E+00	19.E+00	75.E+00	127.63E+0			
0.00E+00	1.14E+00	29.98E+00	55.00E+00	80.02E+00	130.06E+00	167.59E+00	192.61E+00	
217.63E+00	242.65E+00	255.16E+00	267.67E+00	287.60E+00				
180.E+00								
0								
0.0E+00								
.3443E+00	.3657E+00	.3871E+00	.4085E+00	.4377E+00	.4669E+00	.4961E+00	.5350E+00	
.5739E+00	.6128E+00	.6517E+00	.6906E+00	.7295E+00	.7600E+00			
1	0.0000							
19.0000								
9								
0.0000	-1.6000	-2.2700	-1.6000	0.0000	1.6000	2.2700		
1.6000	0.0000							
16.7400	17.4000	19.0000	20.6000	21.2700	20.6000	19.0000		
17.4000	16.7400							
11								
-0.1500	-0.1500	-4.9100	-6.9500	-4.9100	0.0000	4.9100		
6.9500	4.9100	0.1500	0.1500	23.9100	25.9500	23.9100		
0.0000	12.0500	14.0900	19.0000	23.9100	25.9500	23.9100		
19.0000	14.0900	12.0500	0.0000					
11								
-2.0400	-2.0400	-5.7700	-8.1600	-5.7700	0.0000	5.7700		
8.1600	5.7700	2.0400	2.0400	24.7700	27.1600	24.7700		
0.0000	11.1000	13.2300	19.0000	24.7700	27.1600	24.7700		
19.0000	13.2300	11.1000	0.0000					
11								
-3.1700	-3.1700	-6.2400	-8.8200	-6.2400	0.0000	6.2400		
8.8200	6.2400	3.1700	3.1700	25.2400	27.8200	25.2400		
0.0000	10.7700	12.7600	19.0000	25.2400	27.8200	25.2400		
19.0000	12.7600	10.7700	0.0000					
11								
-4.0000	-4.0000	-6.3600	-9.0000	-6.3600	0.0000	6.3600		
9.0000	6.3600	4.0000	4.0000	25.3600	28.0000	25.3600		
0.0000	10.9400	12.6400	19.0000	25.3600	28.0000	25.3600		
19.0000	12.6400	10.9400	0.0000					
11								
-4.0000	-4.0000	-6.3600	-9.0000	-6.3600	0.0000	6.3600		
9.0000	6.3600	4.0000	4.0000	25.3600	28.0000	25.3600		
0.0000	10.9400	12.6400	19.0000	25.3600	28.0000	25.3600		
19.0000	12.6400	10.9400	0.0000					
11								
-3.6300	-3.6300	-6.1500	-8.7000	-6.1500	0.0000	6.1500		
8.7000	6.1500	3.6300	3.6300	25.1500	27.7000	25.1500		
0.0000	11.0900	12.8500	19.0000	25.1500	27.7000	25.1500		

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VM/SP CONVERSATIONAL MONITOR SYSTEM

FILE: SWATH1 DATA A

19.0000	12.8500	11.0900	0.0000				
11							
-2.5700	-2.5700	-5.6600	-8.0100	-5.6600	0.0000	5.6600	
8.0100	5.6600	2.5700	2.5700				
0.0000	11.4200	13.3400	19.0000	24.6600	27.0100	24.6600	
19.0000	13.3400	11.4200	0.0000				
11							
-1.3600	-1.3600	-4.7800	-6.7700	-4.7800	0.0000	4.7800	
6.7700	4.7800	1.3600	1.3600				
0.0000	12.3700	14.2200	19.0000	23.7800	25.7700	23.7800	
19.0000	14.2200	12.3700	0.0000				
11							
-0.1500	-0.1500	-4.2700	-6.0400	-4.2700	0.0000	4.2700	
6.0400	4.2700	0.1500	0.1500				
0.0000	12.9600	14.7300	19.0000	23.2700	25.0400	23.2700	
19.0000	14.7300	12.9600	0.0000				
9							
0.0000	-3.6300	-5.1400	-3.6300	0.0000	3.6300	5.1400	
3.6300	0.0000						
13.8700	15.3700	19.0000	22.6300	24.1400	22.6300	19.0000	
15.3700	13.8700						
9							
0.0000	-0.9800	-1.3900	-0.9800	0.0000	0.9800	1.3900	
0.9800	0.0000						
17.6100	18.0200	19.0000	19.9800	20.3900	19.9800	19.0000	
18.0200	17.6100						
0.E+00							

SWATH1R DATA A

SWATH IV MODEL 5287 AT 28 FT DRAFT  
 HEAD REGULAR WAVES AT 14 FREQUENCIES  
 NEW PROGRAM WITH NEW APPROXIMATE INTEGRALS  
 SEPTEMBER 23, 1984 ( WITH A33 AND B33 PRINTOUTS)  
 CROSS SECTIONAL AREA = 0.1000E+00, 0.3223E+02, 0.3107E+03, 0.5064E+03, 0.6179E+03, 0.6689E+03, 0.6249E+03  
 CROSS SECTIONAL AREA = 0.5157E+03, 0.3541E+03, 0.2370E+03, 0.1657E+03, 0.1214E+02

1	NSTA	NROMS	NENG	NVL	MD	NSP	ML	NW
13	14	1	1	1	1	1	1	0
1	1	1	1	1	1	1	1	0
0	SPAN	CHORD	HMASS	CL	CV	XHFD	DHF	
0	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	0.000000E+00	
0	CB	XLBP	BEAM	DRAFT	RHO	GRAV	XCG	ZCG
0	0.478100	287.600	36.0000	28.0000	1.93200	32.1740	0.000000E+00	3.23000
0	ZETAA	RYR	RXX	RXZ	RZZ	GM	RDLVMX	VISCK
0	1.00000	67.0010	37.5000	0.000000E+00	67.0010	7.99000	0.000000E+00	0.000000E+00
0	XCGP	YCGP	ZCGP	ZDECK	HS	XCGFP		
0	0.000000E+00	37.5000	3.23000	19.0000	75.0000	127.630		
OSTATIONS	127.630	126.490	97.6500	72.6300	47.6100	-2.42999	-39.9600	-64.9800
	-90.0000	-115.020	-127.530	-140.040	-159.970	16.0000	15.0000	14.5200
OFULL BEAMS	0.000000E+00	0.000000E+00	0.600006	8.16000	12.6800			
	10.2800	5.43997	0.600006	0.000000E+00	0.000000E+00			
OBETAAS	180.000							
OLC=0 SC=1	0							
OALPHA	0.000000E+00							
OFREQUENCY	0.344300	0.365700	0.387100	0.408500	0.437700	0.466900	0.496100	0.535000
	0.573900	0.612800	0.651700	0.690600	0.729500	0.760000		
OXI SPACING	1.14001	28.8400	25.0200	25.0200	50.0400	37.5300	25.0200	25.0200
	25.0200	12.5100	12.5099	19.9302				
DISPL	138602.	267778.	DMN					
			0.861549E+07					

SECTIONAL OFFSETS OF BODY PLAN

OSTATION NO.	1	NO.OF POINTS	1
0 X PTS.	37.5000		
0 Y PTS.	-19.0000		
OSTATION NO.	2	NO.OF POINTS	9
0 X PTS.	37.5000	35.9000	
0 Y PTS.	-16.7400	-17.4000	
	-16.7400		
OSTATION NO.	3	NO.OF POINTS	11
0 X PTS.	37.3500	37.3500	
0 Y PTS.	42.4100	37.6500	
0 X PTS.	0.000000E+00	-12.0500	
0 Y PTS.	-14.0900	-12.0500	
OSTATION NO.	4	NO.OF POINTS	11
0 X PTS.	35.4600	35.4600	
0 Y PTS.	43.2700	39.5400	
0 X PTS.	0.000000E+00	-11.1000	
0 Y PTS.	0.000000E+00	-11.1000	

VM/SP CONVERSATIONAL MONITOR SYSTEM

FILE: SWATHIR DATA A

OSTATION NO. O X PTS.	5	-13.2300	NO. OF POINTS	11	-11.1000	0.000000E+00	28.6800	31.2600	37.5000	43.7400	46.3200
O Y PTS.	34.3300	43.7400	40.6700	0.000000E+00	-10.7700	0.000000E+00	-19.0000	-25.2400	-27.8200	-25.2400	-19.0000
OSTATION NO. O X PTS.	6	-12.7600	NO. OF POINTS	11	-10.7700	0.000000E+00	28.5000	31.1400	37.5000	43.8600	46.5000
O Y PTS.	33.5000	43.8600	41.5000	0.000000E+00	-10.9400	0.000000E+00	-19.0000	-25.3600	-28.0000	-25.3600	-19.0000
OSTATION NO. O X PTS.	7	-12.6400	NO. OF POINTS	11	-10.9400	0.000000E+00	28.5000	31.1400	37.5000	43.8600	46.5000
O Y PTS.	33.5000	43.8600	41.5000	0.000000E+00	-10.9400	0.000000E+00	-19.0000	-25.3600	-28.0000	-25.3600	-19.0000
OSTATION NO. O X PTS.	8	-12.8500	NO. OF POINTS	11	-11.0900	0.000000E+00	28.8000	31.3500	37.5000	43.6500	46.2000
O Y PTS.	33.8700	43.6500	41.1300	0.000000E+00	-11.0900	0.000000E+00	-19.0000	-25.1500	-27.7000	-25.1500	-19.0000
OSTATION NO. O X PTS.	9	-12.8500	NO. OF POINTS	11	-11.0900	0.000000E+00	29.4900	31.8400	37.5000	43.1600	45.5100
O Y PTS.	34.9300	43.1600	40.0700	0.000000E+00	-11.4200	0.000000E+00	-19.0000	-24.6600	-27.0100	-24.6600	-19.0000
OSTATION NO. O X PTS.	10	-13.3400	NO. OF POINTS	11	-11.4200	0.000000E+00	30.7300	32.7200	37.5000	42.2800	44.2700
O Y PTS.	36.1400	42.2800	38.8600	0.000000E+00	-12.3700	0.000000E+00	-19.0000	-23.7800	-25.7700	-23.7800	-19.0000
OSTATION NO. O X PTS.	11	-14.2200	NO. OF POINTS	11	-12.3700	0.000000E+00	31.4600	33.2300	37.5000	41.7700	43.5400
O Y PTS.	37.3500	41.7700	37.6500	0.000000E+00	-12.9600	0.000000E+00	-19.0000	-23.2700	-25.0400	-23.2700	-19.0000
OSTATION NO. O X PTS.	12	-14.7300	NO. OF POINTS	9	-12.9600	0.000000E+00	33.8700	37.5000	41.1300	42.6400	41.1300
O Y PTS.	37.5000	37.5000	33.8700	0.000000E+00	-15.3700	0.000000E+00	-22.6300	-24.1400	-22.6300	-19.0000	-15.3700
OSTATION NO. O X PTS.	13	-13.8700	NO. OF POINTS	9	-15.3700	0.000000E+00	36.1100	37.5000	38.4800	38.8900	38.4800
O Y PTS.	37.5000	37.5000	36.5200	0.000000E+00	-18.0200	0.000000E+00	-19.9800	-20.3900	-19.9800	-19.0000	-18.0200
OSTATION NO. O X PTS.	14	-17.6100	NO. OF POINTS	9	-18.0200	0.000000E+00	-19.9800	-20.3900	-19.9800	-19.0000	-18.0200
O Y PTS.	-17.6100	-17.6100	-17.6100								

O	VELOCITY FT/S	0.000000E+00	HEADING ANGLE DEG	180.0	0-EGA	0.344300	OMEGAE	0.344300
	WAVE-L/XLBP	5.92955	FROUDE NO.	0.000000E+00	NDN-DIM. ENC. FREQ.		1.02939	

I=	1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00
I=	2	A33=0.6588E+02	A33ND=0.1058E+01	B33=0.3352E-01	B33ND=0.1564E-02
I=	3	A33=0.6509E+03	A33ND=0.1084E+01	B33=0.1562E+01	B33ND=0.7556E-02
I=	4	A33=0.6397E+03	A33ND=0.6539E+00	B33=0.2789E+02	B33ND=0.8280E-01
I=	5	A33=0.6876E+03	A33ND=0.5761E+00	B33=0.7849E+02	B33ND=0.1910E+00
I=	6	A33=0.6936E+03	A33ND=0.5367E+00	B33=0.1307E+03	B33ND=0.2937E+00
I=	7	A33=0.6936E+03	A33ND=0.5367E+00	B33=0.1307E+03	B33ND=0.2937E+00
I=	8	A33=0.6535E+03	A33ND=0.5413E+00	B33=0.1078E+03	B33ND=0.2599E+00
I=	9	A33=-.1265E+04	A33ND=-.1270E+01	B33=0.6252E+02	B33ND=0.1823E+00
I=	10	A33=0.4631E+03	A33ND=0.6769E+00	B33=0.1169E+02	B33ND=0.4962E-01
I=	11	A33=0.4784E+03	A33ND=0.1045E+01	B33=0.6523E+00	B33ND=0.4138E-02
I=	12	A33=0.3533E+03	A33ND=0.1104E+01	B33=0.9076E+00	B33ND=0.8236E-02
I=	13	A33=0.2453E+02	A33ND=0.1046E+01	B33=0.4576E-02	B33ND=0.5667E-03

HEAVE	1.08517	PHASE	-359.458
PITCH	1.29522	PHASE	-124.163

TRANSF	4.27440	PHASE	-11.6039
BENMOM	0.133857	PHASE	-10.0629
YAWMOM	1.36768	PHASE	-191.489

O	VELOCITY FT/S	0.000000E+00	HEADING ANGLE DEG	180.0	0-EGA	0.365700	OMEGAE	0.365700
	WAVE-L/XLBP	5.25589	FROUDE NO.	0.000000E+00	NDN-DIM. ENC. FREQ.		1.09337	

I=	1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00
I=	2	A33=0.6590E+02	A33ND=0.1058E+01	B33=0.4319E-01	B33ND=0.1897E-02
I=	3	A33=0.6528E+03	A33ND=0.1087E+01	B33=0.2261E+01	B33ND=0.1030E-01
I=	4	A33=0.6359E+03	A33ND=0.6501E+00	B33=0.2649E+02	B33ND=0.7405E-01
I=	5	A33=0.6756E+03	A33ND=0.5660E+00	B33=0.7781E+02	B33ND=0.1782E+00
I=	6	A33=0.6793E+03	A33ND=0.5210E+00	B33=0.1314E+03	B33ND=0.2780E+00
I=	7	A33=0.6733E+03	A33ND=0.5210E+00	B33=0.1314E+03	B33ND=0.2780E+00
I=	8	A33=0.6367E+03	A33ND=0.5274E+00	B33=0.1081E+03	B33ND=0.2449E+00
I=	9	A33=0.4426E+03	A33ND=0.4443E+00	B33=0.3248E+02	B33ND=0.8916E-01
I=	10	A33=0.4617E+03	A33ND=0.6749E+00	B33=0.1098E+02	B33ND=0.4387E-01
I=	11	A33=0.4795E+03	A33ND=0.1047E+01	B33=0.9893E+00	B33ND=0.5908E-02

VM/SP CONVERSATIONAL MONITOR SYSTEM

FILE: SWATH1R DATA A

I= 12 A33=0.3538E+03 A33ND=0.1105E+01 B33=0.1201E+01 B33ND=0.1026E-01  
 I= 13 A33=0.2454E+02 A33ND=0.1046E+01 B33=0.5913E-02 B33ND=0.6894E-03

HEAVE 1.11960 PHASE -359.212  
 PITCH 1.41504 PHASE -125.400

TRANF 0.243111 PHASE -49.1980  
 BENMOM 0.343461E-01 PHASE -189.345  
 YAWMOM 0.107088 PHASE -215.843

0 VELOCITY FT/S 0.000000E+00 HEADING ANGLE DEG 180.0 0-EGA 0.387100 OMEGAE 0.387100  
 WAVE-L/XLBP 4.69083 FROUDE NO. 0.000000E+00NON-DIM. ENC. FREQ. 1.15735

I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
 I= 2 A33=0.6592E+02 A33ND=0.1059E+01 B33=0.5581E-01 B33ND=0.2315E-02  
 I= 3 A33=0.6546E+03 A33ND=0.1090E+01 B33=0.3160E+01 B33ND=0.1360E-01  
 I= 4 A33=0.6332E+03 A33ND=0.6472E+00 B33=0.2478E+02 B33ND=0.6543E-01  
 I= 5 A33=0.6653E+03 A33ND=0.5574E+00 B33=0.7652E+02 B33ND=0.1656E+00  
 I= 6 A33=0.6553E+03 A33ND=0.5071E+00 B33=0.1313E+03 B33ND=0.2624E+00  
 I= 7 A33=0.6553E+03 A33ND=0.5071E+00 B33=0.1313E+03 B33ND=0.2624E+00  
 I= 8 A33=0.6220E+03 A33ND=0.5152E+00 B33=0.1077E+03 B33ND=0.2305E+00  
 I= 9 A33=0.4996E+03 A33ND=0.5015E+00 B33=0.3704E+02 B33ND=0.9605E-01  
 I= 10 A33=0.4607E+03 A33ND=0.6735E+00 B33=0.1013E+02 B33ND=0.3825E-01  
 I= 11 A33=0.4805E+03 A33ND=0.1049E+01 B33=0.1430E+01 B33ND=0.8065E-02  
 I= 12 A33=0.3543E+03 A33ND=0.1107E+01 B33=0.1558E+01 B33ND=0.1257E-01  
 I= 13 A33=0.2454E+02 A33ND=0.1046E+01 B33=0.7725E-02 B33ND=0.8508E-03

HEAVE 1.17289 PHASE -358.768  
 PITCH 1.61287 PHASE -130.774

TRANF 0.101331 PHASE -101.423  
 BENMOM 0.452977E-01 PHASE -192.204  
 YAWMOM 0.559221E-01 PHASE -223.934

0 VELOCITY FT/S 0.000000E+00 HEADING ANGLE DEG 180.0 0-EGA 0.408500 OMEGAE 0.408500  
 WAVE-L/XLBP 4.21223 FROUDE NO. 0.000000E+00NON-DIM. ENC. FREQ. 1.22133

VM/SP CONVERSATIONAL MONITOR SYSTEM

FILE: SWATH1R DATA A

1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
 2 A33=0.6594E+02 A33ND=0.1059E+01 B33=0.7170E-01 B33ND=0.2818E-02  
 3 A33=0.6563E+03 A33ND=0.1093E+01 B33=0.4283E+01 B33ND=0.1747E-01  
 4 A33=0.6314E+03 A33ND=0.6455E+00 B33=0.2279E+02 B33ND=0.5702E-01  
 5 A33=0.6567E+03 A33ND=0.5501E+00 B33=0.7468E+02 B33ND=0.1531E+00  
 6 A33=0.6396E+03 A33ND=0.4949E+00 B33=0.1303E+03 B33ND=0.2469E+00  
 7 A33=0.6396E+03 A33ND=0.4949E+00 B33=0.1303E+03 B33ND=0.2469E+00  
 8 A33=0.6092E+03 A33ND=0.5046E+00 B33=0.1066E+03 B33ND=0.2162E+00  
 9 A33=0.5168E+03 A33ND=0.5187E+00 B33=0.3729E+02 B33ND=0.9162E-01  
 10 A33=0.4602E+03 A33ND=0.6727E+00 B33=0.9167E+01 B33ND=0.3280E-01  
 11 A33=0.4815E+03 A33ND=0.1052E+01 B33=0.1989E+01 B33ND=0.1063E-01  
 12 A33=0.3547E+03 A33ND=0.1108E+01 B33=0.1987E+01 B33ND=0.1519E-01  
 13 A33=0.2454E+02 A33ND=0.1046E+01 B33=0.9666E-02 B33ND=0.1009E-02

HEAVE 1.26994 PHASE -358.138  
 PITCH 1.98852 PHASE -138.410

TRANF 0.138369 PHASE -156.042  
 BENMOM 0.530005E-01 PHASE -192.831  
 YAWMOM 0.361351E-01 PHASE -234.576

O VELOCITY FT/S 0.000000E+00 HEADING ANGLE DEG 180.0 0-EGA 0.437700 OMEGAE 0.437700  
 WAVE-L/XLBP 3.56896 FROUDE NO. 0.000000E+00NON-DIM.ENC.FREQ. 1.30863

1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
 2 A33=0.6595E+02 A33ND=0.1059E+01 B33=0.5725E-01 B33ND=0.3568E-02  
 3 A33=0.6584E+03 A33ND=0.1097E+01 B33=0.6219E+01 B33ND=0.2367E-01  
 4 A33=0.6306E+03 A33ND=0.6446E+00 B33=0.1972E+02 B33ND=0.4605E-01  
 5 A33=0.6475E+03 A33ND=0.5424E+00 B33=0.7139E+02 B33ND=0.1366E+00  
 6 A33=0.6215E+03 A33ND=0.4809E+00 B33=0.1279E+03 B33ND=0.2260E+00  
 7 A33=0.6215E+03 A33ND=0.4809E+00 B33=0.1279E+03 B33ND=0.2260E+00  
 8 A33=0.5947E+03 A33ND=0.4925E+00 B33=0.1042E+03 B33ND=0.1972E+00  
 9 A33=0.5263E+03 A33ND=0.5283E+00 B33=0.3545E+02 B33ND=0.8130E-01  
 10 A33=0.4603E+03 A33ND=0.6728E+00 B33=0.7715E+01 B33ND=0.2577E-01  
 11 A33=0.4827E+03 A33ND=0.1054E+01 B33=0.2968E+01 B33ND=0.1481E-01  
 12 A33=0.3552E+03 A33ND=0.1110E+01 B33=0.2701E+01 B33ND=0.1928E-01  
 13 A33=0.2454E+02 A33ND=0.1046E+01 B33=0.1383E-01 B33ND=0.1347E-02

HEAVE 1.66954 PHASE -358.452  
 PITCH 3.60775 PHASE -157.935

TRANF 0.332657 PHASE -185.696



VM/SP CONVERSATIONAL MONITOR SYSTEM

FILE: SWATH1R DATA A

BENMOM 0.659140E-01 PHASE -193.876  
YAWMOM 0.185204E-01 PHASE -271.742

0	VELOCITY FT/S	0.000000E+00	HEADING ANGLE DEG	180.0	0-EGA	0.466900
	WAVE-L/XLBP	3.22439	FROUDE NO.	0.000000E+00	NON-DIM.	ENC. FREQ.
						1.39594
						OMEGAE
						0.466900

I=	1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00
I=	2	A33=0.6597E+02	A33ND=0.1059E+01	B33=0.1277E+00	B33ND=0.4391E-02
I=	3	A33=0.6602E+03	A33ND=0.1100E+01	B33=0.8679E+01	B33ND=0.3096E-01
I=	4	A33=0.6314E+03	A33ND=0.6455E+00	B33=0.1638E+02	B33ND=0.3587E-01
I=	5	A33=0.6408E+03	A33ND=0.5368E+00	B33=0.6739E+02	B33ND=0.1209E+00
I=	6	A33=0.6069E+03	A33ND=0.4696E+00	B33=0.1243E+03	B33ND=0.2059E+00
I=	7	A33=0.6069E+03	A33ND=0.4696E+00	B33=0.1243E+03	B33ND=0.2059E+00
I=	8	A33=0.5831E+03	A33ND=0.4829E+00	B33=0.1008E+03	B33ND=0.1788E+00
I=	9	A33=0.5313E+03	A33ND=0.5333E+00	B33=0.3243E+02	B33ND=0.6972E-01
I=	10	A33=0.4611E+03	A33ND=0.6740E+00	B33=0.6174E+01	B33ND=0.1933E-01
I=	11	A33=0.4838E+03	A33ND=0.1057E+01	B33=0.4222E+01	B33ND=0.1975E-01
I=	12	A33=0.3556E+03	A33ND=0.1111E+01	B33=0.3570E+01	B33ND=0.2389E-01
I=	13	A33=0.2454E+02	A33ND=0.1046E+01	B33=0.1772E-01	B33ND=0.1618E-02

HEAVE 2.04969 PHASE -67.8790  
PITCH 7.97400 PHASE -279.470

TRANF 0.656502 PHASE -286.787  
BENMOM 0.615826E-01 PHASE -220.489  
YAWMOM 0.415695E-01 PHASE -152.495

0	VELOCITY FT/S	0.000000E+00	HEADING ANGLE DEG	180.0	0-EGA	0.496100
	WAVE-L/XLBP	2.85600	FROUDE NO.	0.000000E+00	NON-DIM.	ENC. FREQ.
						1.48324
						OMEGAE
						0.496100

I=	1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00
I=	2	A33=0.6598E+02	A33ND=0.1059E+01	B33=0.1646E+00	B33ND=0.5329E-02
I=	3	A33=0.6614E+03	A33ND=0.1102E+01	B33=0.1169E+02	B33ND=0.3924E-01
I=	4	A33=0.6337E+03	A33ND=0.6478E+00	B33=0.1295E+02	B33ND=0.2668E-01
I=	5	A33=0.6363E+03	A33ND=0.5330E+00	B33=0.6289E+02	B33ND=0.1062E+00
I=	6	A33=0.5953E+03	A33ND=0.4606E+00	B33=0.1197E+03	B33ND=0.1867E+00
I=	7	A33=0.5953E+03	A33ND=0.4606E+00	B33=0.1197E+03	B33ND=0.1867E+00
I=	8	A33=0.5740E+03	A33ND=0.4755E+00	B33=0.9668E+02	B33ND=0.1614E+00
I=	9	A33=0.5355E+03	A33ND=0.5375E+00	B33=0.2878E+02	B33ND=0.5823E-01
I=	10	A33=0.4626E+03	A33ND=0.6761E+00	B33=0.4628E+01	B33ND=0.1364E-01
I=	11	A33=0.4846E+03	A33ND=0.1058E+01	B33=0.5775E+01	B33ND=0.2542E-01

FILE: SWATH1R DATA A VM/SP CONVERSATIONAL MONITOR SYSTEM

I= 12 A33=0.3558E+03 A33ND=0.1111E+01 B33=0.4603E+01 B33ND=0.2899E-01  
I= 13 A33=0.2454E+02 A33ND=0.1046E+01 B33=0.2291E-01 B33ND=0.1969E-02

HEAVE 0.820874 PHASE -34.3768  
PITCH 1.99937 PHASE -336.830

TRANF 0.176409 PHASE -261.797  
BENMOM 0.627585E-01 PHASE -200.378  
YAWMOM 0.187385E-01 PHASE -215.821

O VELOCITY FT/S 0.00000E+00 HEADING ANGLE DEG 180.0 0-EGA 0.535000 OMEGAE 0.535000  
WAVE-L/XLBP 2.45577 FROUDE NO. 0.00000E+00NON-DIM. ENC. FREQ. 1.59954

I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
I= 2 A33=0.6597E+02 A33ND=0.1059E+01 B33=0.2220E+00 B33ND=0.6653E-02  
I= 3 A33=0.6618E+03 A33ND=0.1102E+01 B33=0.1655E+02 B33ND=0.5155E-01  
I= 4 A33=0.6386E+03 A33ND=0.6528E+00 B33=0.8519E+01 B33ND=0.1628E-01  
I= 5 A33=0.6324E+03 A33ND=0.5298E+00 B33=0.5653E+02 B33ND=0.8854E-01  
I= 6 A33=0.5834E+03 A33ND=0.4514E+00 B33=0.1126E+03 B33ND=0.1629E+00  
I= 7 A33=0.5834E+03 A33ND=0.4514E+00 B33=0.1126E+03 B33ND=0.1629E+00  
I= 8 A33=0.5690E+03 A33ND=0.4679E+00 B33=0.9046E+02 B33ND=0.1401E+00  
I= 9 A33=0.5412E+03 A33ND=0.5432E+00 B33=0.2346E+02 B33ND=0.4401E-01  
I= 10 A33=0.4653E+03 A33ND=0.6802E+00 B33=0.2699E+01 B33ND=0.7373E-02  
I= 11 A33=0.4850E+03 A33ND=0.1059E+01 B33=0.8316E+01 B33ND=0.3395E-01  
I= 12 A33=0.3856E+03 A33ND=0.1111E+01 B33=0.6224E+01 B33ND=0.2635E-01  
I= 13 A33=0.2454E+02 A33ND=0.1046E+01 B33=0.3072E-01 B33ND=0.2448E-02

HEAVE 1.00970 PHASE -19.9349  
PITCH 1.05605 PHASE -5.67931

TRANF 0.369859 PHASE -236.625  
BENMOM 0.746222E-01 PHASE -201.391  
YAWMOM 0.393049E-02 PHASE -236.668

O VELOCITY FT/S 0.00000E+00 HEADING ANGLE DEG 180.0 0-EGA 0.573900 OMEGAE 0.573900  
WAVE-L/XLBP 2.13414 FROUDE NO. 0.00000E+00NON-DIM. ENC. FREQ. 1.71585

FILE: SWATHIR DATA A VM/SP CONVERSATIONAL MONITOR SYSTEM

I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
 I= 2 A33=0.6595E+02 A33ND=0.1059E+01 B33=0.2886E+00 B33ND=0.8074E-02  
 I= 3 A33=0.6605E+03 A33ND=0.1100E+01 B33=0.2232E+02 B33ND=0.6479E-01  
 I= 4 A33=0.6450E+03 A33ND=0.6593E+00 B33=0.4635E+01 B33ND=0.8256E-02  
 I= 5 A33=0.6287E+03 A33ND=0.5267E+00 B33=0.5020E+02 B33ND=0.7328E-01  
 I= 6 A33=0.5738E+03 A33ND=0.4440E+00 B33=0.1049E+03 B33ND=0.1414E+00  
 I= 7 A33=0.5738E+03 A33ND=0.4440E+00 B33=0.1049E+03 B33ND=0.1414E+00  
 I= 8 A33=0.5574E+03 A33ND=0.4616E+00 B33=0.8395E+02 B33ND=0.1212E+00  
 I= 9 A33=0.5477E+03 A33ND=0.5498E+00 B33=0.1808E+02 B33ND=0.3162E-01  
 I= 10 A33=0.4687E+03 A33ND=0.6851E+00 B33=0.1113E+01 B33ND=0.2834E-02  
 I= 11 A33=0.4846E+03 A33ND=0.1058E+01 B33=0.1136E+02 B33ND=0.4323E-01  
 I= 12 A33=0.3550E+03 A33ND=0.1109E+01 B33=0.8095E+01 B33ND=0.4407E-01  
 I= 13 A33=0.2454E+02 A33ND=0.1046E+01 B33=0.4020E-01 B33ND=0.2987E-02

HEAVE 1.32376 PHASE -20.5126  
 PITCH 0.940130 PHASE -24.2558

TRANF 0.785958 PHASE -246.575  
 BENMOM 0.875007E-01 PHASE -209.988  
 YAWMOM 0.148448E-01 PHASE -71.8783

O VELOCITY FT/S 0.000000E+00 HEADING ANGLE DEG 180.0 D-EGA 0.612800 OMEGAE 0.612800  
 WAVE-L/XLBP 1.87180 FROUDE NO. 0.000000E+00NDN-DIM.ENC.FREQ. 1.83215

I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
 I= 2 A33=0.6591E+02 A33ND=0.1058E+01 B33=0.3621E+00 B33ND=0.9488E-02  
 I= 3 A33=0.6573E+03 A33ND=0.1095E+01 B33=0.2876E+02 B33ND=0.7817E-01  
 I= 4 A33=0.6522E+03 A33ND=0.6667E+00 B33=0.1641E+01 B33ND=0.2738E-02  
 I= 5 A33=0.6183E+03 A33ND=0.5179E+00 B33=0.4171E+02 B33ND=0.5701E-01  
 I= 6 A33=0.5630E+03 A33ND=0.4357E+00 B33=0.9661E+02 B33ND=0.1220E+00  
 I= 7 A33=0.5630E+03 A33ND=0.4357E+00 B33=0.9661E+02 B33ND=0.1220E+00  
 I= 8 A33=0.5472E+03 A33ND=0.4532E+00 B33=0.7708E+02 B33ND=0.1042E+00  
 I= 9 A33=0.5550E+03 A33ND=0.5571E+00 B33=0.1304E+02 B33ND=0.2136E-01  
 I= 10 A33=0.4724E+03 A33ND=0.6905E+00 B33=0.3974E-01 B33ND=0.9480E-04  
 I= 11 A33=0.4832E+03 A33ND=0.1055E+01 B33=0.1479E+02 B33ND=0.5273E-01  
 I= 12 A33=0.3538E+03 A33ND=0.1105E+01 B33=0.1014E+02 B33ND=0.5171E-01  
 I= 13 A33=0.2454E+02 A33ND=0.1046E+01 B33=0.5031E-01 B33ND=0.3500E-02

HEAVE 2.19008 PHASE -31.3415  
 PITCH 1.23501 PHASE -38.7137

TRANF 2.09674 PHASE -273.632

FILE: SWATH1R DATA A VM/SP CONVERSATIONAL MONITOR SYSTEM

BENMOM O.114732 PHASE -240.191  
YAWMOM O.628093E-01 PHASE -82.8800

O VELOCITY FT/S 0.000000E+00 HEADING ANGLE DEG 180.0 0-EGA 0.651700 OMEGAE 0.651700  
WAVE-L/XLBP 1.65501 FROUDE NO. 0.000000E+00NON-DIM.ENC.FREQ. 1.94845

- I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00
- I= 2 A33=0.6585E+02 A33ND=0.1057E+01 B33=0.4383E+00 B33ND=0.1080E-01
- I= 3 A33=0.6520E+03 A33ND=0.1086E+01 B33=0.3545E+02 B33ND=0.9062E-01
- I= 4 A33=0.6596E+03 A33ND=0.6743E+00 B33=-.2258E+00 B33ND=-.3542E-03
- I= 5 A33=0.6160E+03 A33ND=0.5160E+00 B33=0.1046E+02 B33ND=0.1344E-01
- I= 6 A33=0.5445E+03 A33ND=0.4213E+00 B33=0.8428E+02 B33ND=0.1001E+00
- I= 7 A33=0.5445E+03 A33ND=0.4213E+00 B33=0.8428E+02 B33ND=0.1001E+00
- I= 8 A33=0.5264E+03 A33ND=0.4360E+00 B33=0.6385E+02 B33ND=0.8115E-01
- I= 9 A33=0.5628E+03 A33ND=0.5650E+00 B33=0.8625E+01 B33ND=0.1328E-01
- I= 10 A33=0.4761E+03 A33ND=0.6959E+00 B33=-.3951E+00 B33ND=-.8851E-03
- I= 11 A33=0.4806E+03 A33ND=0.1050E+01 B33=0.1842E+02 B33ND=0.6174E-01
- I= 12 A33=0.3520E+03 A33ND=0.1100E+01 B33=0.1225E+02 B33ND=0.5871E-01
- I= 13 A33=0.2453E+02 A33ND=0.1046E+01 B33=0.6104E-01 B33ND=0.3993E-02

HEAVE 5.25012 PHASE -110.333  
PITCH 2.49553 PHASE -108.300

TRANF 7.35456 PHASE -22.1383  
BENMOM O.247012 PHASE -25.1185  
YAWMOM O.514295 PHASE -167.304

O VELOCITY FT/S 0.000000E+00 HEADING ANGLE DEG 180.0 0-EGA 0.690600 OMEGAE 0.690600  
WAVE-L/XLBP 1.47381 FROUDE NO. 0.000000E+00NON-DIM.ENC.FREQ. 2.06475

- I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00
- I= 2 A33=0.6577E+02 A33ND=0.1056E+01 B33=0.5123E+00 B33ND=0.1191E-01
- I= 3 A33=0.6447E+03 A33ND=0.1074E+01 B33=0.4187E+02 B33ND=0.1010E+00
- I= 4 A33=0.6666E+03 A33ND=0.6814E+00 B33=-.8755E+00 B33ND=-.1296E-02
- I= 5 A33=0.6599E+03 A33ND=0.5528E+00 B33=0.5759E+00 B33ND=0.6986E-03
- I= 6 A33=0.5246E+03 A33ND=0.4060E+00 B33=0.4835E+02 B33ND=0.5417E-01
- I= 7 A33=0.5246E+03 A33ND=0.4060E+00 B33=0.4835E+02 B33ND=0.5417E-01
- I= 8 A33=0.5232E+03 A33ND=0.4333E+00 B33=0.2051E+02 B33ND=0.2460E-01
- I= 9 A33=0.5707E+03 A33ND=0.5728E+00 B33=0.5013E+01 B33ND=0.7287E-02
- I= 10 A33=0.4794E+03 A33ND=0.7007E+00 B33=-.1478E+00 B33ND=-.3128E-03
- I= 11 A33=0.4770E+03 A33ND=0.1042E+01 B33=0.2197E+02 B33ND=0.6949E-01

VM/SP CONVERSATIONAL MONITOR SYSTEM

FILE: SWATH1R DATA A

I= 12 A33=0.3496E+03 A33ND=0.1092E+01 B33=0.1426E+02 B33ND=0.6450E-01  
 I= 13 A33=0.2452E+02 A33ND=0.1045E+01 B33=0.7149E-01 B33ND=0.4413E-02

HEAVE 1.39410 PHASE -183.184  
 PITCH 0.602511 PHASE -160.530

TRANF 2.39061 PHASE -126.898  
 BENMOM 0.138014 PHASE -147.961  
 YAWMOM 0.256454 PHASE -295.232

O VELOCITY FT/S 0.000000E+00 HEADING ANGLE DEG 180.0 D-EGA 0.729500 OMEGAE 0.729500  
 WAVE-L/XLBP 1.32082 FROUDE NO. 0.000000E+00NON-DIM. ENC.FREQ. 2.18106

I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
 I= 2 A33=0.6568E+02 A33ND=0.1055E+01 B33=0.5783E+00 B33ND=0.1273E-01  
 I= 3 A33=0.6357E+03 A33ND=0.1059E+01 B33=0.4732E+02 B33ND=0.1081E+00  
 I= 4 A33=0.6726E+03 A33ND=0.6875E+00 B33=-.3644E+00 B33ND=-.5106E-03  
 I= 5 A33=0.6758E+03 A33ND=0.5662E+00 B33=0.2467E+01 B33ND=0.2833E-02  
 I= 6 A33=0.5705E+03 A33ND=0.4414E+00 B33=0.3845E+01 B33ND=0.4079E-02  
 I= 7 A33=0.5705E+03 A33ND=0.4414E+00 B33=0.3845E+01 B33ND=0.4079E-02  
 I= 8 A33=0.5773E+03 A33ND=0.4781E+00 B33=-.5030E-01 B33ND=-.5711E-04  
 I= 9 A33=0.5783E+03 A33ND=0.5805E+00 B33=0.2303E+01 B33ND=0.3169E-02  
 I= 10 A33=0.4820E+03 A33ND=0.7045E+00 B33=0.7278E+00 B33ND=0.1458E-02  
 I= 11 A33=0.4724E+03 A33ND=0.1032E+01 B33=0.2509E+02 B33ND=0.7513E-01  
 I= 12 A33=0.3467E+03 A33ND=0.1083E+01 B33=0.1598E+02 B33ND=0.6843E-01  
 I= 13 A33=0.2450E+02 A33ND=0.1045E+01 B33=0.8081E-01 B33ND=0.4723E-02

HEAVE 0.575261 PHASE -196.747  
 PITCH 0.272932 PHASE -145.355

TRANF 0.872831 PHASE -179.434  
 BENMOM 0.891435E-01 PHASE -182.737  
 YAWMOM 0.942668E-01 PHASE -348.871

O VELOCITY FT/S 0.000000E+00 HEADING ANGLE DEG 180.0 O-EGA 0.760000 OMEGAE 0.760000  
 WAVE-L/XLBP 1.21694 FROUDE NO. 0.000000E+00NON-DIM. ENC.FREQ. 2.27225

FILE: SWATH1R DATA A VM/SP CONVERSATIONAL MONITOR SYSTEM

I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
 I= 2 A33=0.6559E+02 A33ND=0.1053E+01 B33=0.6202E+00 B33ND=0.1310E-01  
 I= 3 A33=0.6278E+03 A33ND=0.1046E+01 B33=0.5045E+02 B33ND=0.1106E+00  
 I= 4 A33=0.6765E+03 A33ND=0.6916E+00 B33=0.7343E+00 B33ND=0.9876E-03  
 I= 5 A33=0.6835E+03 A33ND=0.5726E+00 B33=0.2042E+01 B33ND=0.2251E-02  
 I= 6 A33=0.6092E+03 A33ND=0.4713E+00 B33=0.2819E+00 B33ND=0.2870E-03  
 I= 7 A33=0.6092E+03 A33ND=0.4713E+00 B33=0.2819E+00 B33ND=0.2870E-03  
 I= 8 A33=0.5998E+03 A33ND=0.4968E+00 B33=0.1838E+01 B33ND=0.2003E-02  
 I= 9 A33=0.5839E+03 A33ND=0.5861E+00 B33=0.8181E+00 B33ND=0.1081E-02  
 I= 10 A33=0.4835E+03 A33ND=0.7067E+00 B33=0.1765E+01 B33ND=0.3395E-02  
 I= 11 A33=0.4684E+03 A33ND=0.1023E+01 B33=0.2699E+02 B33ND=0.7756E-01  
 I= 12 A33=0.3443E+03 A33ND=0.1076E+01 B33=0.1700E+02 B33ND=0.6987E-01  
 I= 13 A33=0.2449E+02 A33ND=0.1044E+01 B33=0.8678E-01 B33ND=0.4868E-02

HEAVE 0.376777 PHASE -200.946  
 PITCH 0.207992 PHASE -134.036

TRANF 0.419238 PHASE -203.892  
 BENMOM 0.631095E-01 PHASE -189.551  
 YAMMOM 0.488495E-01 PHASE -7.94806  
 CROSS SECTIONAL AREA =

SWATH3 DATA A

SWATH IV MODEL 5287 AT 32 FT DRAFT (WITH LARGE FINS )  
 HEAD REGULAR WAVES AT 14 FREQUENCIES AND AT 20 KNOTS  
 NEW PROGRAM WITH NEW APPROXIMATE INTEGRALS  
 SEPTEMBER 29 ,1984 ( WITH A33 AND B33 PRINTOUTS)

13	14	1	1	1	0	1	668.938	624.924
1.000E-06	32.234	310.724	506.352	617.856	668.938	668.938	668.938	624.924
515.654	354.110	236.996	165.676	12.140				
0.1636E+020	1360E+020	0.000E+003	0.000E+004	0.000E+00-	1150E+03-	2300E+02		
0.4781E+00	287.6E+00	36.E+00	32.E+00	1.932E+00	32174E+02	0.E+00	3.23E+00	
1.E+0067	001E+00	37.E+00	0.E+0067	001E+00	7.99E+00	0.E+00	0.E+00	
0.E+00	37.5E+00	3.23E+00	19.E+00	75.E+00	127.63E+0			
0.00E+00	1.14E+00	29.98E+00	55.00E+00	80.02E+00	130.06E+00	167.59E+00	192.61E+00	
217.63E+00242	.65E+00255	.16E+00267	.67E+00287	.60E+00				
180.E+00								
0								
0.0E+00								
.3443E+00	.3657E+00	.3871E+00	.4085E+00	.4377E+00	.4669E+00	.4961E+00	.5350E+00	
.5739E+00	.6128E+00	.6517E+00	.6906E+00	.7295E+00	.7600E+00			
1								
0.0000								
23.0000								
9								
0.0000	-1.6000	-2.2700	-1.6000	0.0000	1.6000	2.2700		
1.6000	0.0000							
20.7400	21.4000	23.0000	24.6000	25.2700	24.6000	23.0000		
21.4000	20.7400							
11								
-0.1500	-0.1500	-4.9100	-6.9500	-4.9100	0.0000	4.9100		
6.9500	4.9100	0.1500	0.1500					
0.0000	16.0500	18.0900	23.0000	27.9100	29.9500	27.9100		
23.0000	18.0900	16.0500	0.0000					
11								
-2.0400	-2.0400	-5.7700	-8.1600	-5.7700	0.0000	5.7700		
8.1600	5.7700	2.0400	2.0400					
0.0000	15.1000	17.2300	23.0000	28.7700	31.1600	28.7700		
23.0000	17.2300	15.1000	0.0000					
11								
-3.1700	-3.1700	-6.2400	-8.8200	-6.2400	0.0000	6.2400		
8.8200	6.2400	3.1700	3.1700					
0.0000	14.7700	16.7600	23.0000	29.2400	31.8200	29.2400		
23.0000	16.7600	14.7700	0.0000					
11								
-4.0000	-4.0000	-6.3600	-9.0000	-6.3600	0.0000	6.3600		
9.0000	6.3600	4.0000	4.0000					
0.0000	14.9400	16.6400	23.0000	29.3600	32.0000	29.3600		
23.0000	16.6400	14.9400	0.0000					
11								
-4.0000	-4.0000	-6.3600	-9.0000	-6.3600	0.0000	6.3600		
9.0000	6.3600	4.0000	4.0000					
0.0000	14.9400	16.6400	23.0000	29.3600	32.0000	29.3600		
23.0000	16.6400	14.9400	0.0000					
11								
-3.6300	-3.6300	-6.1500	-8.7000	-6.1500	0.0000	6.1500		
8.7000	6.1500	3.6300	3.6300					
0.0000	15.0900	16.8500	23.0000	29.1500	31.7000	29.1500		



FILE: SWATH3 DATA A VM/SP CONVERSATIONAL MONITOR SYSTEM

23.0000	16.8500	15.0900	0.0000			
11						
-2.5700	-2.5700	-5.6600	-8.0100	-5.6600	0.0000	5.6600
8.0100	5.6600	2.5700	2.5700			
0.0000	15.4200	17.3400	23.0000	28.6600	31.0100	28.6600
23.0000	17.3400	15.4200	0.0000			
11						
-1.3600	-1.3600	-4.7800	-6.7700	-4.7800	0.0000	4.7800
6.7700	4.7800	1.3600	1.3600			
0.0000	16.3700	18.2200	23.0000	27.7800	29.7700	27.7800
23.0000	18.2200	16.3700	0.0000			
11						
-0.1500	-0.1500	-4.2700	-6.0400	-4.2700	0.0000	4.2700
6.0400	4.2700	0.1500	0.1500			
0.0000	16.9600	18.7300	23.0000	27.2700	29.0400	27.2700
23.0000	18.7300	16.9600	0.0000			
9						
0.0000	-3.6300	-5.1400	-3.6300	0.0000	3.6300	5.1400
3.6300	0.0000					
17.8700	19.3700	23.0000	26.6300	28.1400	26.6300	23.0000
19.3700	17.8700					
9						
0.0000	-0.9800	-1.3900	-0.9800	0.0000	0.9800	1.3900
0.9800	0.0000					
21.6100	22.0200	23.0000	23.9800	24.3900	23.9800	23.0000
22.0200	21.6100					
33.76E+00						

SWATH3R DATA A

SWATH IV MODEL 5287 AT 32 FT DRAFT (WITH LARGE FINS )  
 HEAD REGULAR WAVES AT 14 FREQUENCIES AND AT 20 KNOTS  
 NEW PROGRAM WITH NEW APPROXIMATE INTEGRALS  
 SEPTEMBER 29 , 1984 ( WITH A33 AND B33 PRINTOUTS )

CROSS SECTIONAL AREA =0.1000E-050.3223E+020.3107E+030.5064E+030.6179E+030.6689E+030.6689E+030.6249E+03  
 CROSS SECTIONAL AREA =0.5157E+030.3541E+030.2370E+030.1657E+030.1214E+02

1	NSTA	NRDMS	NENC	NVL	MD	NSP	ML	NW
	13	14	1	1	1	1	1	0
	NALPHA							
0	SPAN	CHORD	HMASS	CL	CV	XHFO	DHF	
	16.3600	13.6000	0.000000E+00	3.00000	4.00000	-115.000	-23.0000	
0	CB	XLBP	BEAM	DRAFT	RHD	GRAY	XCG	ZCG
	0.478100	287.600	36.0000	32.0000	1.93200	32.1740	0.000000E+00	3.23000
0	ZETAA	RYV	RXX	RXZ	RZZ	GM	ROLLVMX	VISCK
	1.00000	67.0010	37.5000	0.000000E+00	67.0010	7.99000	0.000000E+00	0.000000E+00
0	XCGP	YCGP	ZCGP	ZDECK	HS	XCGFP		
	0.000000E+00	37.5000	3.23000	19.0000	75.0000	127.630		
OSTATIONS	127.630	126.490	97.6500	72.6300	47.6100	-2.42999	-39.9600	-64.9800
	-90.0000	-115.020	-127.530	-140.040	-159.970			
OFULL BEAMS	0.000000E+00	0.000000E+00	0.600006	8.16000	12.6800	16.0000	16.0000	14.5200
	10.2800	5.43997	0.600006	0.000000E+00	0.000000E+00			
OBETAAS	180.000							
OLC=0 SC=1								
OALPHA	0.000000E+00							
OFREQUENCY	0.344300	0.365700	0.387100	0.408500	0.437700	0.466900	0.496100	0.535000
	0.573900	0.612800	0.651700	0.690600	0.729500	0.760000		
OXI SPACING	1.14001	28.8400	25.0200	25.0200	50.0400	37.5300	25.0200	25.0200
	25.0200	12.5100	12.5099	19.9302				
0	DISPL	GMASS	DMN					
	158402.	306032.	0.984628E+07					

SECTIONAL OFFSETS OF BODY PLAN

OSTATION NO.	X PTS.	Y PTS.	NO.OF POINTS
1	37.5000	-23.0000	1
2	37.5000	35.9000	9
3	37.3500	-21.4000	11
4	37.3500	37.3500	11
5	37.6500	-16.0500	11
6	37.6500	35.4600	11
7	39.5400	-17.2300	11
8	39.5400	39.5400	11
9	31.7300	-23.0000	11
10	31.7300	31.7300	11
11	31.7300	39.5400	11
12	31.7300	39.5400	11
13	31.7300	39.5400	11
14	31.7300	39.5400	11
15	31.7300	39.5400	11
16	31.7300	39.5400	11
17	31.7300	39.5400	11
18	31.7300	39.5400	11
19	31.7300	39.5400	11
20	31.7300	39.5400	11
21	31.7300	39.5400	11
22	31.7300	39.5400	11
23	31.7300	39.5400	11
24	31.7300	39.5400	11
25	31.7300	39.5400	11
26	31.7300	39.5400	11
27	31.7300	39.5400	11
28	31.7300	39.5400	11
29	31.7300	39.5400	11
30	31.7300	39.5400	11
31	31.7300	39.5400	11
32	31.7300	39.5400	11
33	31.7300	39.5400	11
34	31.7300	39.5400	11
35	31.7300	39.5400	11
36	31.7300	39.5400	11
37	31.7300	39.5400	11
38	31.7300	39.5400	11
39	31.7300	39.5400	11
40	31.7300	39.5400	11
41	31.7300	39.5400	11
42	31.7300	39.5400	11
43	31.7300	39.5400	11
44	31.7300	39.5400	11
45	31.7300	39.5400	11
46	31.7300	39.5400	11
47	31.7300	39.5400	11
48	31.7300	39.5400	11
49	31.7300	39.5400	11
50	31.7300	39.5400	11
51	31.7300	39.5400	11
52	31.7300	39.5400	11
53	31.7300	39.5400	11
54	31.7300	39.5400	11
55	31.7300	39.5400	11
56	31.7300	39.5400	11
57	31.7300	39.5400	11
58	31.7300	39.5400	11
59	31.7300	39.5400	11
60	31.7300	39.5400	11
61	31.7300	39.5400	11
62	31.7300	39.5400	11
63	31.7300	39.5400	11
64	31.7300	39.5400	11
65	31.7300	39.5400	11
66	31.7300	39.5400	11
67	31.7300	39.5400	11
68	31.7300	39.5400	11
69	31.7300	39.5400	11
70	31.7300	39.5400	11
71	31.7300	39.5400	11
72	31.7300	39.5400	11
73	31.7300	39.5400	11
74	31.7300	39.5400	11
75	31.7300	39.5400	11
76	31.7300	39.5400	11
77	31.7300	39.5400	11
78	31.7300	39.5400	11
79	31.7300	39.5400	11
80	31.7300	39.5400	11
81	31.7300	39.5400	11
82	31.7300	39.5400	11
83	31.7300	39.5400	11
84	31.7300	39.5400	11
85	31.7300	39.5400	11
86	31.7300	39.5400	11
87	31.7300	39.5400	11
88	31.7300	39.5400	11
89	31.7300	39.5400	11
90	31.7300	39.5400	11
91	31.7300	39.5400	11
92	31.7300	39.5400	11
93	31.7300	39.5400	11
94	31.7300	39.5400	11
95	31.7300	39.5400	11
96	31.7300	39.5400	11
97	31.7300	39.5400	11
98	31.7300	39.5400	11
99	31.7300	39.5400	11
100	31.7300	39.5400	11



VELOCITY FT/S	33.7600	HEADING ANGLE DEG	180.0	O-EGA	0.344300	OMEGAE	0.468686
WAVE-L/XLBP	5.92955	FROUDE NO.	0.350958	NON-DIM. ENC. FREQ.	1.40128		
I= 1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00	B33ND=0.0000E+00		
I= 2	A33=0.6579E+02	A33ND=0.1056E+01	B33=0.1226E+00	B33ND=0.5719E-02			
I= 3	A33=0.6451E+03	A33ND=0.1075E+01	B33=0.8185E+01	B33ND=0.3960E-01			
I= 4	A33=0.6283E+03	A33ND=0.6423E+00	B33=0.1520E+02	B33ND=0.4513E-01			
I= 5	A33=0.6184E+03	A33ND=0.5181E+00	B33=0.5334E+02	B33ND=0.1298E+00			
I= 6	A33=0.6254E+03	A33ND=0.4839E+00	B33=0.1307E+03	B33ND=0.2938E+00			
I= 7	A33=0.6254E+03	A33ND=0.4839E+00	B33=0.1307E+03	B33ND=0.2938E+00			
I= 8	A33=0.6761E+03	A33ND=0.5600E+00	B33=0.1641E+03	B33ND=0.3949E+00			
I= 9	A33=0.5438E+03	A33ND=0.5459E+00	B33=0.3699E+02	B33ND=0.1078E+00			
I= 10	A33=0.4602E+03	A33ND=0.6727E+00	B33=0.5318E+01	B33ND=0.2258E-01			
I= 11	A33=0.4757E+03	A33ND=0.1039E+01	B33=0.4020E+01	B33ND=0.2550E-01			
I= 12	A33=0.3507E+03	A33ND=0.1096E+01	B33=0.3383E+01	B33ND=0.3070E-01			
I= 13	A33=0.2452E+02	A33ND=0.1045E+01	B33=0.1695E-01	B33ND=0.2039E-02			

HEAVE	1.56149	PHASE	-17.7156
PITCH	0.704924	PHASE	-28.6497

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

VELOCITY FT/S	33.7600	HEADING ANGLE DEG	180.0	O-EGA	0.365700	OMEGAE	0.506029
WAVE-L/XLBP	5.25589	FROUDE NO.	0.350958	NON-DIM. ENC. FREQ.	1.51292		
I= 1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00			
I= 2	A33=0.6579E+02	A33ND=0.1056E+01	B33=0.1668E+00	B33ND=0.7325E-02			
I= 3	A33=0.6457E+03	A33ND=0.1076E+01	B33=0.1174E+02	B33ND=0.5348E-01			
I= 4	A33=0.6315E+03	A33ND=0.6455E+00	B33=0.1099E+02	B33ND=0.3071E-01			
I= 5	A33=0.6202E+03	A33ND=0.5196E+00	B33=0.4498E+02	B33ND=0.1030E+00			
I= 6	A33=0.6137E+03	A33ND=0.4749E+00	B33=0.1351E+03	B33ND=0.2858E+00			
I= 7	A33=0.6137E+03	A33ND=0.4749E+00	B33=0.1351E+03	B33ND=0.2858E+00			
I= 8	A33=0.1094E+02	A33ND=0.9060E-02	B33=0.7413E+02	B33ND=0.1679E+00			
I= 9	A33=0.5432E+03	A33ND=0.5453E+00	B33=0.3117E+02	B33ND=0.8556E-01			
I= 10	A33=0.4623E+03	A33ND=0.6757E+00	B33=0.3515E+01	B33ND=0.1405E-01			
I= 11	A33=0.4761E+03	A33ND=0.1040E+01	B33=0.5881E+01	B33ND=0.3512E-01			
I= 12	A33=0.3507E+03	A33ND=0.1096E+01	B33=0.4605E+01	B33ND=0.3934E-01			
I= 13	A33=0.2452E+02	A33ND=0.1045E+01	B33=0.2318E-01	B33ND=0.2702E-02			

HEAVE 1.69131 PHASE -25.2692  
 PITCH 0.988853 PHASE -26.1657

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

0 VELOCITY FT/S 33.7600 HEADING ANGLE DEG 180.0 O-EGA 0.387100 OMEGAE 0.544333  
 WAVE-L/XLBP 4.69083 FROUDE NO. 0.350958 NON-DIM. ENC. FREQ. 1.62745

- I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00
- I= 2 A33=0.6578E+02 A33ND=0.1056E+01 B33=0.2199E+00 B33ND=0.9122E-02
- I= 3 A33=0.6450E+03 A33ND=0.1074E+01 B33=0.1614E+02 B33ND=0.6944E-01
- I= 4 A33=0.6365E+03 A33ND=0.6506E+00 B33=0.6932E+01 B33ND=0.1830E-01
- I= 5 A33=0.6255E+03 A33ND=0.5240E+00 B33=0.3622E+02 B33ND=0.7838E-01
- I= 6 A33=0.5890E+03 A33ND=0.4558E+00 B33=0.1553E+03 B33ND=0.3105E+00
- I= 7 A33=0.5890E+03 A33ND=0.4558E+00 B33=0.1553E+03 B33ND=0.3105E+00
- I= 8 A33=0.4848E+03 A33ND=0.4015E+00 B33=0.1910E+02 B33ND=0.4087E-01
- I= 9 A33=0.5455E+03 A33ND=0.5476E+00 B33=0.2487E+02 B33ND=0.6449E-01
- I= 10 A33=0.4650E+03 A33ND=0.6797E+00 B33=0.1891E+01 B33ND=0.7139E-02
- I= 11 A33=0.4760E+03 A33ND=0.1040E+01 B33=0.8206E+01 B33ND=0.4630E-01
- I= 12 A33=0.3502E+03 A33ND=0.1094E+01 B33=0.6072E+01 B33ND=0.4901E-01
- I= 13 A33=0.2452E+02 A33ND=0.1045E+01 B33=0.3048E-01 B33ND=0.3357E-02

HEAVE 2.01248 PHASE -31.2417  
 PITCH 1.27673 PHASE -61.1328

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

0 VELOCITY FT/S 33.7600 HEADING ANGLE DEG 180.0 O-EGA 0.408500 OMEGAE 0.583598  
 WAVE-L/XLBP 4.21223 FROUDE NO. 0.350958 NON-DIM. ENC. FREQ. 1.74484

- I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00
- I= 2 A33=0.6574E+02 A33ND=0.1056E+01 B33=0.2803E+00 B33ND=0.1102E-01
- I= 3 A33=0.6427E+03 A33ND=0.1071E+01 B33=0.2128E+02 B33ND=0.6679E-01
- I= 4 A33=0.6428E+03 A33ND=0.6571E+00 B33=0.3426E+01 B33ND=0.8574E-02
- I= 5 A33=0.6337E+03 A33ND=0.5309E+00 B33=0.2761E+02 B33ND=0.5662E-01
- I= 6 A33=0.3708E+03 A33ND=0.2869E+00 B33=0.1712E+03 B33ND=0.3242E+00

I= 7 A33=0.3708E+03 A33ND=0.2869E+00 B33=0.1712E+03 B33ND=0.3242E+00  
 I= 8 A33=0.5381E+03 A33ND=0.4457E+00 B33=0.2741E+02 B33ND=0.5557E-01  
 I= 9 A33=0.5503E+03 A33ND=0.5523E+00 B33=0.1852E+02 B33ND=0.4551E-01  
 I= 10 A33=0.4683E+03 A33ND=0.6845E+00 B33=0.6270E+00 B33ND=0.2243E-02  
 I= 11 A33=0.4750E+03 A33ND=0.1037E+01 B33=0.1096E+02 B33ND=0.5862E-01  
 I= 12 A33=0.3493E+03 A33ND=0.1091E+01 B33=0.7750E+01 B33ND=0.5927E-01  
 I= 13 A33=0.2451E+02 A33ND=0.1045E+01 B33=0.3937E-01 B33ND=0.4110E-02

HEAVE 2.42889 PHASE -46.5606  
 PITCH 1.38279 PHASE -75.4145

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

O VELOCITY FT/S 33.7600 HEADING ANGLE DEG 180.0 O-EGA 0.437700 OMEGAE 0.638725  
 WAVE-L/XLBP 3.66896 FROUDE NO. 0.350958 NON-DIM. ENC. FREQ. 1.90966

I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
 I= 2 A33=0.6567E+02 A33ND=0.1055E+01 B33=0.3714E+00 B33ND=0.1362E-01  
 I= 3 A33=0.6365E+03 A33ND=0.1060E+01 B33=0.2905E+02 B33ND=0.1105E+00  
 I= 4 A33=0.6525E+03 A33ND=0.6670E+00 B33=0.1873E+00 B33ND=0.4375E-03  
 I= 5 A33=0.6479E+03 A33ND=0.5427E+00 B33=0.1701E+02 B33ND=0.3256E-01  
 I= 6 A33=0.5415E+03 A33ND=0.4190E+00 B33=0.4430E+01 B33ND=0.7832E-02  
 I= 7 A33=0.5415E+03 A33ND=0.4190E+00 B33=0.4430E+01 B33ND=0.7832E-02  
 I= 8 A33=0.5672E+03 A33ND=0.4698E+00 B33=0.2430E+02 B33ND=0.4598E-01  
 I= 9 A33=0.5597E+03 A33ND=0.5618E+00 B33=0.1060E+02 B33ND=0.2432E-01  
 I= 10 A33=0.4729E+03 A33ND=0.6913E+00 B33=-.2087E+00 B33ND=-.6969E-03  
 I= 11 A33=0.4720E+03 A33ND=0.1031E+01 B33=0.1519E+02 B33ND=0.7580E-01  
 I= 12 A33=0.3471E+03 A33ND=0.1084E+01 B33=0.1023E+02 B33ND=0.7303E-01  
 I= 13 A33=0.2450E+02 A33ND=0.1045E+01 B33=0.5181E-01 B33ND=0.5047E-02

HEAVE 3.04463 PHASE -93.1087  
 PITCH 2.31822 PHASE -129.173

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

O VELOCITY FT/S 33.7600 HEADING ANGLE DEG 180.0 O-EGA 0.466900 OMEGAE 0.695642  
 WAVE-L/XLBP 3.22439 FROUDE NO. 0.350958 NON-DIM. ENC. FREQ. 2.07983

I=	1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00	B33ND=0.0000E+00
I=	2	A33=0.6556E+02	A33ND=0.1053E+01	B33=0.4610E+00	B33ND=0.1585E-01	B33ND=0.1585E-01
I=	3	A33=0.6267E+03	A33ND=0.1044E+01	B33=0.3654E+02	B33ND=0.1304E+00	B33ND=0.1304E+00
I=	4	A33=0.6616E+03	A33ND=0.6763E+00	B33=-.7087E+00	B33ND=-.1552E-02	B33ND=-.1552E-02
I=	5	A33=0.6635E+03	A33ND=0.5558E+00	B33=0.8624E+01	B33ND=0.1547E-01	B33ND=0.1547E-01
I=	6	A33=0.6004E+03	A33ND=0.4646E+00	B33=0.1376E+02	B33ND=0.2281E-01	B33ND=0.2281E-01
I=	7	A33=0.6004E+03	A33ND=0.4646E+00	B33=0.1376E+02	B33ND=0.2281E-01	B33ND=0.2281E-01
I=	8	A33=0.5874E+03	A33ND=0.4865E+00	B33=0.1733E+02	B33ND=0.3074E-01	B33ND=0.3074E-01
I=	9	A33=0.5708E+03	A33ND=0.5730E+00	B33=0.4484E+01	B33ND=0.9639E-02	B33ND=0.9639E-02
I=	10	A33=0.4770E+03	A33ND=0.6972E+00	B33=0.1967E+02	B33ND=0.6158E-03	B33ND=0.6158E-03
I=	11	A33=0.4669E+03	A33ND=0.1020E+01	B33=0.1939E+02	B33ND=0.9070E-01	B33ND=0.9070E-01
I=	12	A33=0.3438E+03	A33ND=0.1074E+01	B33=0.1260E+02	B33ND=0.8431E-01	B33ND=0.8431E-01
I=	13	A33=0.2449E+02	A33ND=0.1044E+01	B33=0.6443E-01	B33ND=0.5883E-02	B33ND=0.5883E-02

HEAVE	1.61694	PHASE	-138.266
PITCH	1.22564	PHASE	-178.733

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

O	VELOCITY FT/S	33.7600	HEADING ANGLE DEG	180.0	D-EGA	0.496100	OMEGAE	0.754347
	WAVE-L/XLRP	2.85600	FROUDE NO.	0.350958	NON-DIM.	ENC.FREQ.	2.25535	

I=	1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00	B33ND=0.0000E+00
I=	2	A33=0.6541E+02	A33ND=0.1050E+01	B33=0.5303E+00	B33ND=0.1716E-01	B33ND=0.1716E-01
I=	3	A33=0.6139E+03	A33ND=0.1023E+01	B33=0.4197E+02	B33ND=0.1409E+00	B33ND=0.1409E+00
I=	4	A33=0.6686E+03	A33ND=0.6835E+00	B33=0.7402E+00	B33ND=0.1525E-02	B33ND=0.1525E-02
I=	5	A33=0.6787E+03	A33ND=0.5686E+00	B33=0.2950E+01	B33ND=0.4881E-02	B33ND=0.4881E-02
I=	6	A33=0.6254E+03	A33ND=0.4839E+00	B33=0.1149E+02	B33ND=0.1792E-01	B33ND=0.1792E-01
I=	7	A33=0.6254E+03	A33ND=0.4839E+00	B33=0.1149E+02	B33ND=0.1792E-01	B33ND=0.1792E-01
I=	8	A33=0.6052E+03	A33ND=0.5013E+00	B33=0.1042E+02	B33ND=0.1739E-01	B33ND=0.1739E-01
I=	9	A33=0.5818E+03	A33ND=0.5840E+00	B33=0.7577E+00	B33ND=0.1533E-02	B33ND=0.1533E-02
I=	10	A33=0.4795E+03	A33ND=0.7009E+00	B33=0.1728E+01	B33ND=0.5092E-02	B33ND=0.5092E-02
I=	11	A33=0.4602E+03	A33ND=0.1005E+01	B33=0.2262E+02	B33ND=0.9956E-01	B33ND=0.9956E-01
I=	12	A33=0.3397E+03	A33ND=0.1061E+01	B33=0.1433E+02	B33ND=0.9025E-01	B33ND=0.9025E-01
I=	13	A33=0.2447E+02	A33ND=0.1043E+01	B33=0.7446E-01	B33ND=0.6399E-02	B33ND=0.6399E-02

HEAVE	0.810084	PHASE	-154.487
PITCH	0.610819	PHASE	-194.454

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY



O	VELOCITY FT/S	33.7600	HEADING ANGLE DEG	180.0	O-EGA	0.535000	OMEGAE	0.835334
	WAVE-L/XLBP	2.45577	FROUDE NO.	0.350958	NON-DIM.	ENC.FREQ.	2.49748	
I=	1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00			
I=	2	A33=0.6520E+02	A33ND=0.1047E+01	B33=0.5556E+00	B33ND=0.1668E-01			
I=	3	A33=0.5960E+03	A33ND=0.9927E+00	B33=0.4251E+02	B33ND=0.1324E+00			
I=	4	A33=0.6733E+03	A33ND=0.6882E+00	B33=0.4953E+01	B33ND=0.9463E-02			
I=	5	A33=0.6962E+03	A33ND=0.5832E+00	B33=0.4487E+00	B33ND=0.7025E-03			
I=	6	A33=0.6504E+03	A33ND=0.5032E+00	B33=0.5385E+01	B33ND=0.7788E-02			
I=	7	A33=0.6504E+03	A33ND=0.5032E+00	B33=0.5385E+01	B33ND=0.7788E-02			
I=	8	A33=0.6263E+03	A33ND=0.5187E+00	B33=0.3553E+01	B33ND=0.5500E-02			
I=	9	A33=0.5940E+03	A33ND=0.5962E+00	B33=0.5903E+00	B33ND=0.1108E-02			
I=	10	A33=0.4802E+03	A33ND=0.7018E+00	B33=0.4472E+01	B33ND=0.1222E-01			
I=	11	A33=0.4503E+03	A33ND=0.9838E+00	B33=0.2348E+02	B33ND=0.9587E-01			
I=	12	A33=0.3388E+03	A33ND=0.1043E+01	B33=0.1461E+02	B33ND=0.8530E-01			
I=	13	A33=0.2444E+02	A33ND=0.1042E+01	B33=0.7828E-01	B33ND=0.6238E-02			

HEAVE	0.376844	PHASE	-163.036
PITCH	0.285552	PHASE	-196.729

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

O	VELOCITY FT/S	33.7600	HEADING ANGLE DEG	180.0	O-EGA	0.573900	OMEGAE	0.919497
	WAVE-L/XLBP	2.13414	FROUDE NO.	0.350958	NON-DIM.	ENC.FREQ.	2.74911	
I=	1	A33=0.0000E+00	A33ND=0.0000E+00	B33=0.0000E+00	B33ND=0.0000E+00			
I=	2	A33=0.6503E+02	A33ND=0.1044E+01	B33=0.4648E+00	B33ND=0.1301E-01			
I=	3	A33=0.5839E+03	A33ND=0.9727E+00	B33=0.3278E+02	B33ND=0.9514E-01			
I=	4	A33=0.6732E+03	A33ND=0.6882E+00	B33=0.4962E+01	B33ND=0.1596E-01			
I=	5	A33=0.7093E+03	A33ND=0.5942E+00	B33=0.2789E-01	B33ND=0.4072E-04			
I=	6	A33=0.6709E+03	A33ND=0.5191E+00	B33=0.1016E+01	B33ND=0.1370E-02			
I=	7	A33=0.6709E+03	A33ND=0.5191E+00	B33=0.1016E+01	B33ND=0.1370E-02			
I=	8	A33=0.6437E+03	A33ND=0.5332E+00	B33=0.1014E+00	B33ND=0.1464E-03			
I=	9	A33=0.6020E+03	A33ND=0.6043E+00	B33=0.8549E+00	B33ND=0.1495E-02			
I=	10	A33=0.4785E+03	A33ND=0.6994E+00	B33=0.5974E+01	B33ND=0.1522E-01			
I=	11	A33=0.4434E+03	A33ND=0.9684E+00	B33=0.1877E+02	B33ND=0.7142E-01			
I=	12	A33=0.3297E+03	A33ND=0.1030E+01	B33=0.1167E+02	B33ND=0.6355E-01			
I=	13	A33=0.2444E+02	A33ND=0.1041E+01	B33=0.6579E-01	B33ND=0.4888E-02			

FILE: SWATH3R DATA A VM/SP CONVERSATIONAL MONITOR SYSTEM

HEAVE 0.189195 PHASE -167.686  
PITCH 0.151821 PHASE -187.397

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

O VELOCITY FT/S 33.7600 HEADING ANGLE DEG 180.0 D-EGA 0.612800 OMEGAE 1.00583  
WAVE-L/XLBP 1.87180 FROUDE NO. 0.350958 NON-DIM. ENC. FREQ. 3.01023

- I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00
- I= 2 A33=0.6500E+02 A33ND=0.1044E+01 B33=0.2659E+00 B33ND=0.6967E-02
- I= 3 A33=0.5853E+03 A33ND=0.9750E+00 B33=0.1552E+02 B33ND=0.4218E-01
- I= 4 A33=0.6714E+03 A33ND=0.6863E+00 B33=0.1012E+02 B33ND=0.1689E-01
- I= 5 A33=0.7180E+03 A33ND=0.6015E+00 B33=0.2765E+01 B33ND=0.3779E-02
- I= 6 A33=0.6871E+03 A33ND=0.5317E+00 B33=-.4409E+00 B33ND=-.5567E-03
- I= 7 A33=0.6871E+03 A33ND=0.5317E+00 B33=-.4409E+00 B33ND=-.5567E-03
- I= 8 A33=0.6571E+03 A33ND=0.5442E+00 B33=-.3331E+00 B33ND=-.4502E-03
- I= 9 A33=0.6064E+03 A33ND=0.6087E+00 B33=0.3227E+01 B33ND=0.5285E-02
- I= 10 A33=0.4773E+03 A33ND=0.6976E+00 B33=0.4641E+01 B33ND=0.1107E-01
- I= 11 A33=0.4433E+03 A33ND=0.9682E+00 B33=0.9498E+01 B33ND=0.3385E-01
- I= 12 A33=0.3296E+03 A33ND=0.1030E+01 B33=0.6095E+01 B33ND=0.3108E-01
- I= 13 A33=0.2441E+02 A33ND=0.1041E+01 B33=0.3815E-01 B33ND=0.2654E-02

HEAVE 0.952339E-01 PHASE -172.406  
PITCH 0.943332E-01 PHASE -168.931

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

O VELOCITY FT/S 33.7600 HEADING ANGLE DEG 180.0 D-EGA 0.651700 OMEGAE 1.09735  
WAVE-L/XLBP 1.65501 FROUDE NO. 0.350958 NON-DIM. ENC. FREQ. 3.28085

- I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00
- I= 2 A33=0.6516E+02 A33ND=0.1046E+01 B33=0.5606E-01 B33ND=0.1381E-02
- I= 3 A33=0.6024E+03 A33ND=0.1003E+01 B33=0.1370E+01 B33ND=0.3501E-02
- I= 4 A33=0.6713E+03 A33ND=0.6862E+00 B33=0.7602E+01 B33ND=0.1192E-01
- I= 5 A33=0.7231E+03 A33ND=0.6058E+00 B33=0.6493E+01 B33ND=0.8346E-02
- I= 6 A33=0.6992E+03 A33ND=0.5410E+00 B33=0.5465E+00 B33ND=0.6489E-03
- I= 7 A33=0.6992E+03 A33ND=0.5410E+00 B33=0.5465E+00 B33ND=0.6489E-03
- I= 8 A33=0.6667E+03 A33ND=0.5522E+00 B33=0.1291E+01 B33ND=0.1641E-02
- I= 9 A33=0.6087E+03 A33ND=0.6110E+00 B33=0.5056E+01 B33ND=0.7788E-02

VM/SP CONVERSATIONAL MONITOR SYSTEM

SWATH3R DATA A

- I= 10 A33=0.4795E+03 A33ND=0.7008E+00 B33=0.1368E+01 B33ND=0.3068E-02
- I= 11 A33=0.4521E+03 A33ND=0.9873E+00 B33=0.1159E+01 B33ND=0.3884E-02
- I= 12 A33=0.3346E+03 A33ND=0.1045E+01 B33=0.9096E+00 B33ND=0.4360E-02
- I= 13 A33=0.2443E+02 A33ND=0.1042E+01 B33=0.8405E-02 B33ND=0.5499E-03

HEAVE 0.460838E-01 PHASE -180.907  
 PITCH 0.731938E-01 PHASE -147.997

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

O VELOCITY FT/S 33.7600 HEADING ANGLE DEG 180.0 D-EGA 0.690600 OMEGAE 1.19104  
 WAVE-L/XLBP 1.47381 FROUDE NO. 0.350958 NON-DIM. ENC. FREQ. 3.56096

- I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00
- I= 2 A33=0.6547E+02 A33ND=0.1051E+01 B33=0.2063E-01 B33ND=0.4798E-03
- I= 3 A33=0.6280E+03 A33ND=0.1046E+01 B33=0.5538E+01 B33ND=0.1336E-01
- I= 4 A33=0.6758E+03 A33ND=0.6908E+00 B33=0.2768E+01 B33ND=0.4097E-02
- I= 5 A33=0.7260E+03 A33ND=0.6082E+00 B33=0.1003E+02 B33ND=0.1216E-01
- I= 6 A33=0.7077E+03 A33ND=0.5476E+00 B33=0.3003E+01 B33ND=0.3365E-02
- I= 7 A33=0.7077E+03 A33ND=0.5476E+00 B33=0.3003E+01 B33ND=0.3365E-02
- I= 8 A33=0.6731E+03 A33ND=0.5575E+00 B33=0.3918E+01 B33ND=0.4699E-02
- I= 9 A33=0.6103E+03 A33ND=0.6126E+00 B33=0.5554E+01 B33ND=0.8073E-02
- I= 10 A33=0.4861E+03 A33ND=0.7105E+00 B33=0.2444E+00 B33ND=0.5173E-03
- I= 11 A33=0.4663E+03 A33ND=0.1018E+01 B33=0.2368E+01 B33ND=0.7488E-02
- I= 12 A33=0.3430E+03 A33ND=0.1072E+01 B33=0.1072E+01 B33ND=0.4850E-02
- I= 13 A33=0.2447E+02 A33ND=0.1043E+01 B33=0.2546E-02 B33ND=0.1572E-03

HEAVE 0.225389E-01 PHASE -200.757  
 PITCH 0.658821E-01 PHASE -133.252

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

O VELOCITY FT/S 33.7600 HEADING ANGLE DEG 180.0 D-EGA 0.729500 OMEGAE 1.28790  
 WAVE-L/XLBP 1.32082 FROUDE NO. 0.350958 NON-DIM. ENC. FREQ. 3.85057

- I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00
- I= 2 A33=0.6577E+02 A33ND=0.1056E+01 B33=0.3404E+00 B33ND=0.7492E-02

FILE: SWATH3R DATA A VM/SP CONVERSATIONAL MONITOR SYSTEM

I= 3 A33=0.6470E+03 A33ND=0.1078E+01 B33=0.3813E+02 B33ND=0.8706E-01  
 I= 4 A33=0.6878E+03 A33ND=0.7031E+00 B33=0.9105E-01 B33ND=0.1276E-03  
 I= 5 A33=0.7279E+03 A33ND=0.6098E+00 B33=0.1260E+02 B33ND=0.1447E-01  
 I= 6 A33=0.7135E+03 A33ND=0.5521E+00 B33=0.5950E+01 B33ND=0.6311E-02  
 I= 7 A33=0.7135E+03 A33ND=0.5521E+00 B33=0.5950E+01 B33ND=0.6311E-02  
 I= 8 A33=0.6775E+03 A33ND=0.5611E+00 B33=0.6655E+01 B33ND=0.7556E-02  
 I= 9 A33=0.6130E+03 A33ND=0.6153E+00 B33=0.4460E+01 B33ND=0.6136E-02  
 I= 10 A33=0.4946E+03 A33ND=0.7229E+00 B33=0.7429E+01 B33ND=0.1488E-01  
 I= 11 A33=0.4778E+03 A33ND=0.1043E+01 B33=0.1967E+02 B33ND=0.5890E-01  
 I= 12 A33=0.3501E+03 A33ND=0.1094E+01 B33=0.1063E+02 B33ND=0.4551E-01  
 I= 13 A33=0.2452E+02 A33ND=0.1045E+01 B33=0.4659E-01 B33ND=0.2723E-02

HEAVE 0.162893E-01 PHASE -232.107  
 PITCH 0.604795E-01 PHASE -125.768

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY

O VELOCITY FT/S 33.7600 HEADING ANGLE DEG 180.0 D-EGA 0.760000 OMEGAE 1.36607  
 WAVE-L/XLBP 1.21694 FROUDE NO. 0.350958 NON-DIM. ENC. FREQ. 4.08428

I= 1 A33=0.0000E+00 A33ND=0.0000E+00 B33=0.0000E+00 B33ND=0.0000E+00  
 I= 2 A33=0.6584E+02 A33ND=0.1057E+01 B33=0.8517E+00 B33ND=0.1800E-01  
 I= 3 A33=0.6467E+03 A33ND=0.1077E+01 B33=0.8030E+02 B33ND=0.1760E+00  
 I= 4 A33=0.7042E+03 A33ND=0.7199E+00 B33=0.8061E+01 B33ND=0.1084E-01  
 I= 5 A33=0.7296E+03 A33ND=0.6112E+00 B33=0.1365E+02 B33ND=0.1505E-01  
 I= 6 A33=0.7169E+03 A33ND=0.5547E+00 B33=0.8115E+01 B33ND=0.8262E-02  
 I= 7 A33=0.7169E+03 A33ND=0.5547E+00 B33=0.8115E+01 B33ND=0.8262E-02  
 I= 8 A33=0.6801E+03 A33ND=0.5633E+00 B33=0.8474E+01 B33ND=0.9235E-02  
 I= 9 A33=0.6171E+03 A33ND=0.6194E+00 B33=0.2525E+01 B33ND=0.3335E-02  
 I= 10 A33=0.4984E+03 A33ND=0.7285E+00 B33=0.2202E+02 B33ND=0.4236E-01  
 I= 11 A33=0.4785E+03 A33ND=0.1045E+01 B33=0.4340E+02 B33ND=0.1247E+00  
 I= 12 A33=0.3509E+03 A33ND=0.1096E+01 B33=0.2427E+02 B33ND=0.9978E-01  
 I= 13 A33=0.2453E+02 A33ND=0.1046E+01 B33=0.1184E+00 B33ND=0.6642E-02

HEAVE 0.174111E-01 PHASE -246.968  
 PITCH 0.548540E-01 PHASE -123.215

THIS PROGRAM CAN NOT CALCULATE DYNAMIC LOAD WITH NON-ZERO SHIP VELOCITY