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FINAL DESIGN SPECIFICATION
FOR
LARSYS/ISOCLS MODIFICATION FOR LACIE PHASE III

Job Order 71-695

(TIP 76-0086)

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(E80-10212) FINAL DESIGN SPECIFICATION FOR
LARSYS/ISOCLS MODIFICATION FOR LACIE PHASE 3
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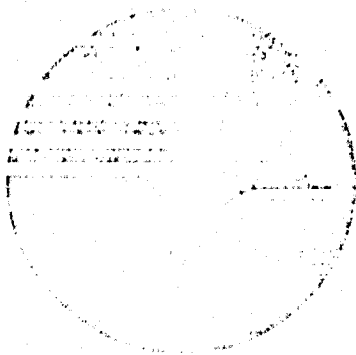
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Houston, Texas
Contract NAS 9-12200
For
EARTH OBSERVATIONS DIVISION



National Aeronautics and Space Administration
LYNNBON L. JOHNSON SPACE CENTRE
Houston, Texas
February 1977

LEC-10161

JSC-12542

FINAL DESIGN SPECIFICATION
FOR
LARSYS/ISOCLS MODIFICATION FOR LACIE PHASE III

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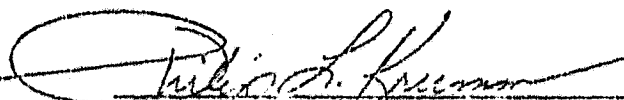
(TIRF 76-0086)

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
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February 1977

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1. SCOPE

1.1 GENERAL

This specification establishes the final design of modifications to the ISOCLS program within the EOD-LARSYS system, as specified in the Requirements Document REF: 642-2104.

2. APPLICABLE DOCUMENTS

The following documents, of exact issue shown, form a part of this specification to the extent specified herein.

- Action Document: 63-1327-1695-06
- Requirements Specification: REF: 642-2104
- TIRF 76-0086

3. SYSTEM DESCRIPTION

3.1 HARDWARE DESCRIPTION

N/A

3.2 SOFTWARE DESCRIPTION

The purpose of this modification is to:

- a. Develop a ranking capability for cluster splitting and cluster merging. In cluster splitting, the standard deviations will be ranked in descending order to insure that the clusters having the largest of standard deviations greater than STD_{MAX} will be given the highest priority for splitting. In cluster merging, the inter-cluster distances will be ranked in ascending order to insure that the clusters having the smallest of inter-cluster distances less than DL_{MIN} will be given the highest priority for combining.
- b. Compute and print out an Error Criterion E after each iteration.
- c. Develop a cluster deletion procedure after the final iteration. The procedure is as follows: After the final or statistics pass P_1 , there will be a test on the population of each cluster. If the population of any cluster falls below a user specified level, $PMIN$, plus the number of channels, the cluster(s) will be eliminated. There will be a second pass P_2 to reassign the pixels of the eliminated cluster(s) to the cluster centers of P_1 . The statistics pass will be P_2 . If there are no clusters deleted after P_1 , the statistics pass will be P_1 .

- d. Simplify the coding logical in ISODAT. To accomplish this requirement, only one procedure for clustering will be developed and maintained. The simulated ERIPS procedure will be maintained, and the coding for the standard LARSYS procedure will be extracted from ISODAT and SETUP7. The control card OPTION SIMERP will no longer be a valid control card.
- e. Expand the input capabilities of the clustering processor to optionally access mean values from a saved statistic file (cards, drum, or tape file). These mean values will serve as starting vectors for the cluster processor.

The following control card inputs are required for this modification:

- Cluster Ranking During Splitting and Combining
No new control card input.

- Error Computation

Control card - OPTION ERCOMP

ERCOMP is a key that triggers the computation of

$$E = \left[\frac{1}{M} \sum_{K=1}^{LNCAT} DN(K) \sum_{J=1}^{NOFEAT} \sigma_j^2(K) \right]^{1/2}$$

where DN(K) is the number of pixels in cluster K,
LNCAT is the number of clusters,
NOFEAT is the number of channels used in clustering,
 $\sigma_j^2(K)$ is the variance of the j th channel of the
 k th cluster,

M is the total number of pixels being clustered,
and prints the value of E after each iteration.

- Cluster Deletion Procedure

Control card - PMIN N

PMIN is a user threshold value for cluster deletion. If the population of a cluster is less than PMIN plus the number of channels, the cluster is deleted after the final pass, P_1 .

- Access Mean Values from a Saved Statistics File

Control Cards - STATFILE INPUT/UNIT=N,FILE=M

STATFILE OUTPUT/UNIT=N,FILE=M

CHANNELS STAT=N₁,...,N_n,DATA=M₁,...,M_n

MODULE

SUBCLASSES N₁,...,N_n

with M and N being integer numbers.

STATFILE INPUT/UNIT=N,FILE=M specifies the unit the input STAT file (starting vectors) is mounted on, and the number of the file to process. Defaults to self-starting vectors. If FILE is omitted, the default is File=1.

STATFILE OUTPUT/UNIT=N,FILE=M specifies the unit the output STAT file is mounted on, and the number of the file to create. Default values are unit=1 and file=1.

CHANNELS STAT=N₁,...,N_n,DATA=M₁,...,M_n. N₁,N₂,...,N_n are channel numbers referring to the input STAT file.

M₁,M₂,...,M_m are channel numbers referring to the MSS data tape. If STATFILE INPUT/UNIT=N,FILE=M control card is input, STAT set of channels must be defined.

MODULE triggers the input of the input Module STA:
card deck. Default-No statistics card deck.

SUBCLASSES N_1, \dots, N_n are the subclass numbers referring
to the input STAT file.

3.2.1 ISOCLS

3.2.1.1 Linkages

ISOCLS is called from MONTOR. ISOCLS calls LARSAA routines SETUP7, RDDATA, RDFILE, ISODAT, CHAIN, PRINT, DSTAPE, COVAR1, TWRITE, and PCHST1. UNIVAC system routines CMERR and RWRITE are also utilized.

3.2.1.2 Interfaces

N/A

3.2.1.3 Inputs

Input to the clustering processor ISOCLS consist of control cards, field/class definitions and imagery data tape. See SETUP7 description for control card input and RDDATA for imagery data input.

3.2.1.4 Outputs

The outputs of the ISOCLS processor are line printer clustering results, cluster map tape and a statistics file.

3.2.1.5 Storage Requirements

Storage used: Code-1017(8), Data-26475(8).

3.2.1.6 Description

ISOCLS performs a modified version of the clustering algorithm (ISODAT). The program expects multispectral scanner data in either the LARSYS 2 or Universal format.

3.2.1.7 Detailed Flowchart

N/A

3.2.1.8 Listing

See Appendix A for program listing.

3.2.2 SETUP7

3.2.2.1 Linkages

SETUP7 is called from ISOCLS. SETUP7 calls NXTCHR, NUMBER, FLTNUM, FIND and RDMEAN.

3.2.2.2 Interfaces

N/A

3.2.2.3 Inputs

The inputs to the SETUP7 subroutine which affect this specification are the control cards which include the keywords PMIN, STATFILE, CHANNELS, MODULE, SUBCLASSES and OPTION ERCOMP.

3.2.2.4 Outputs

The output of the SETUP7 subroutine is the input summary which includes cluster summary, cluster map, DAS output tape with cluster means (defaults) or cluster numbers.

3.2.2.5 Storage Requirements

Storage used: Code-1222(8), Data-547(8).

3.2.2.6 Description

SETUP7 reads and analyzes all parameter values and sets defaults for all control card input for the ISOCLS processor.

3.2.2.7 Detailed Flowcharts

N/A

3.2.2.8 Listing

See Appendix B for program listing.

3.2.3 ISODAT

3.2.3.1 Linkages

ISODAT is called from ISOCLS. ISODAT calls UNIVAC system routines RREAD, RWRITE and CLOCK. LARSAA routines CLDIST and PRINT are also called.

3.2.3.2 Interfaces

N/A

3.2.3.3 Inputs

The inputs to the ISODAT subroutine which affect this modification are parameter values of keywords PMIN, STATFILE, CHANNELS, SUBCLASSES, MODULE and OPTION ERCOMP.

3.2.3.4 Outputs

The outputs of the ISODAT subroutine are the line printer cluster summaries at each iteration.

3.2.3.5 Storage Requirements

Storage used: Code-2010(8), Data-614(8).

3.2.3.6 Description

All calculations of the clustering algorithms are done by ISODAT.

3.2.3.7 Detailed Flowcharts

N/A

3.2.4 GETSTA

3.2.4.1 Linkages

GETSTA is called from ISOCLS. GETSTA calls LARSAA routine EXIT and Univac routines FSBSFL and CMERR.

3.2.4.2 Interfaces

The module STAT file is the only interface between ISOCLS and other LARSAA processors. The file may be obtained from STAT or a previous execution of ISOCLS.

3.2.4.3 Inputs

The new parameters that were added to the subroutine GETSTA are SUBVEC - Subclasses from input statistics file for initial means, and NOSUB2 - Number of initial means.

3.2.4.4 Outputs

N/A

3.2.4.5 Storage Requirements

Storage used: Code-433(8), Data-1130(8).

3.2.4.6 Description

GETSTA extracts means from input MODULE STAT deck/file. The user may specify a subset of the channels and/or subclasses.

3.2.4.7 Detailed Flowcharts

N/A

3.2.4.8 Listing

See Appendix C for program listing.

3.2.5 DESCEN

3.2.5.1 Linkages

DESCEN is called from ISODAT.

3.2.5.2 Interfaces

N/A

3.2.5.3 Inputs

The arguments for the subroutine DESCEN are:

SCN - An output array dimensioned by LNCAT that contains values in descending order.

LNCAT - The current number of clusters.

IPTT - An array dimensioned by LNCAT. IPTT is used as a pointer to the reordered SCN array.

3.2.5.4 Outputs

N/A

3.2.5.5 Storage Requirements

N/A

3.2.5.6 Description

DESCEN ranks SCN values in descending order and IPTT is used as a pointer to these values.

3.2.5.7 Detailed Flowcharts

N/A

3.2.5.8 Listing

See Appendix D for program listing.

3.2.6 PSPLIT

3.2.6.1 Linkages

PSPLIT is called from ISODAT.

3.2.6.2 Interfaces

N/A

3.2.6.3 Inputs

The arguments for the subroutine PSPLIT are:

- MEANS - An input array containing the means of the last NMIN iteration.
- STDEV - An input/output array containing the standard deviations.
- N - An input/output array containing the number of points in each cluster.
- CLD - An input/output array containing the intercluster distances.
- C - An input array for storing the imagery data.
- IPLACE - An input array for storing the cluster number each corresponding pixels belongs to.
- AVP - A temporary array for computing the means.
- MEN - An output array containing the means of the PMIN iteration.

3.2.6.4 Outputs

N/A

3.2.6.5 Storage Requirements

Requires 577₈ words of core.

3.2.6.6 Description

If all clusters have a population greater than the parameter PMIN, PSPLIT returns to the calling routine without any re-assignment of the data; otherwise, all clusters with less than PMIN points are deleted, and the data reassigned to the remaining clusters.

3.2.6.7 Detailed Flowchart

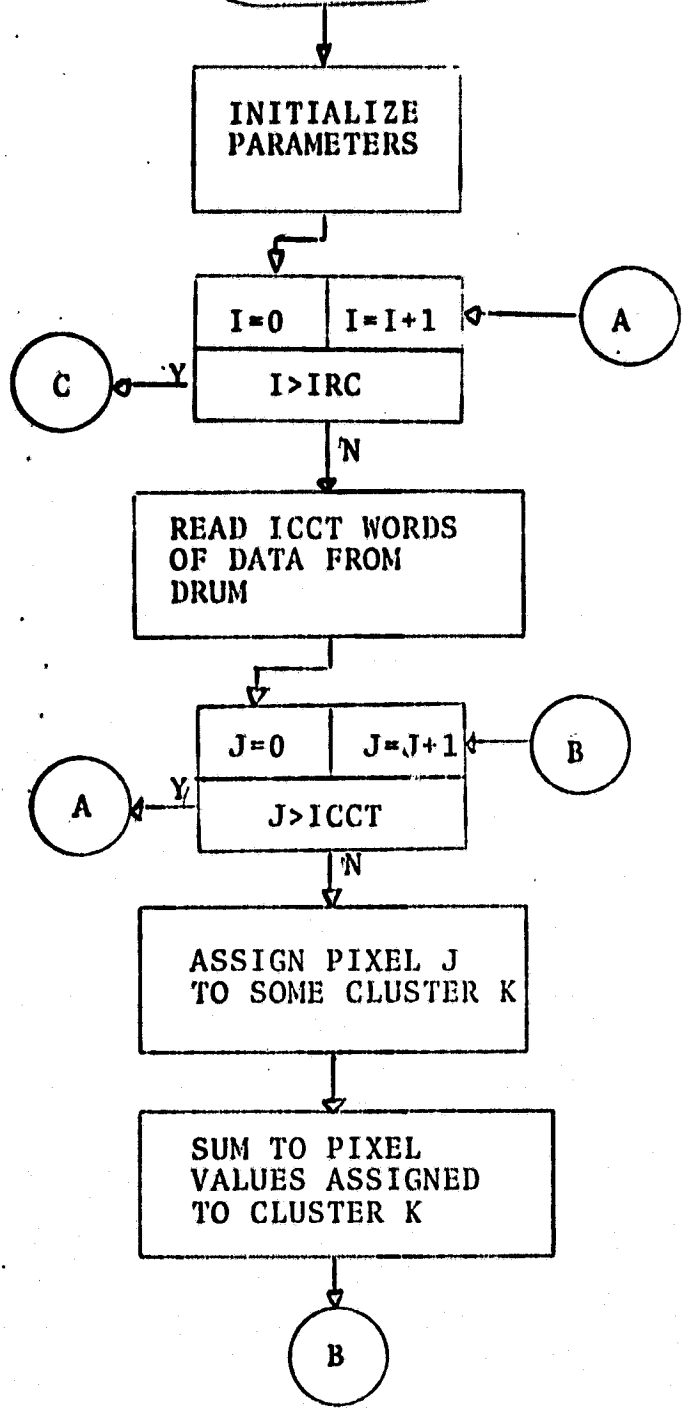
See following page.

3.2.6.8 Listing

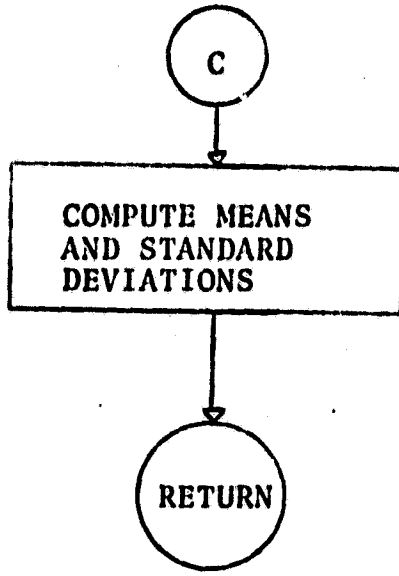
See Appendix E for program listing.

MEANS, STDEV,
N, CLD, C, 1PLACE,
AVP, AMN, MEN

IRC=NUMBER
OF READS
FROM DRUM



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3.2.7 ISODAT

3.2.7.1 Linkages

ISODAT is called by ISOCLS and calls the routines CLDIST, PRINT, PSPLIT, and DESCEN.

3.2.7.2 Interfaces

N/A

3.2.7.3 Inputs

N/A

3.2.7.4 Outputs

N/A

3.2.7.5 Storage Requirements

Requires 30476₈ words of core.

3.2.7.6 Description

ISODAT performs the clustering. The routine was modified to rank the standard deviations in descending order to insure that the clusters having the largest of standard deviations would be given the highest priority for splitting. The inter-cluster distances are ranked in ascending order to insure that the clusters having the smallest of intercluster distances would be given highest priority for combining.

3.2.7.7 Detailed Flowchart

N/A

3.2.7.8 Listing

See Appendix F for program listing.

4. OPERATION

The EOD-LARSYS system is operational on the Univac 1108 EXEC2. To exercise the capabilities implemented as described in this document, see the User's Documentation EOD-LARSYS and list of added control cards in section 3.2.

5. TEST PROCEDURE

5.1 GENERAL

Using a 16 channel tape for checkout, verification that the modifications to EOD-LARSYS system were correct was substantiated in the following manner:

- a. The output of the cluster summary showed that the clusters having the largest of standard deviations greater than STDMAX were split and that the clusters having the smallest of intercluster distances less than DLMIN were combined.
- b. The error criterion E was printed after each iteration.
- c. The output of the final cluster summary showed that after the statistics pass, there were no clusters with a population less than the value of PMIN plus the number of channels.
- d. The means from the statistics tape created by the ISOCLS processor were used as starting vectors for clustering. This verified the expansion of the input capabilities of the clustering processor to optionally access mean values from a saved statistics file.

5.2 COMPUTER RUN

To further verify that the modifications were implemented as outlined by the Requirements Specification, Ref: 642-2104, the same set of data was clustered on both ERIPS and LARSYS. The results are shown on the following pages.

LARSYS RUN

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SISOCLS

INPUT SUMMARY

I=0
 ERCOMP DATA=13,14,15,16
 CHANNELS 5
 CLASSE 20
 NMIN 90
 PERCENT 3.6
 DLMIN 3.6
 STD MAX SC
 SEQUEN 12
 ISTOP 12
 END

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YOU HAVE SELECTED THE FOLLOWING PARAMETER VALUES AND OPTIONS

STOP AFTER 12 ITERATION(S)
 ALLOW A MINIMUM OF 20 PIXELS PER CLUSTER
 PRINT A CLUSTER SUMMARY EVERY 20 ITERATION(S)
 PRINT A CLUSTER MAP EVERY 20 ITERATION(S)
 ALLOW A MAXIMUM OF 60 CLUSTERS PER CLASS
 THE STATISTICS FILE WILL BE WRITTEN AFTER 5 CLASS(ES) HAVE BEEN CLUSTERED
 CHANNELS ARE--- 13 14 15 16
 DLMIN = 3.600
 STD MAX = 3.600
 SEP = 1.000

INPUT IMAGE DATA TAPE INFORMATION

UNIVERSAL: 20
 NO. OF CHANNELS/LINE 196
 NO. OF PIXELS/LINE 1
 FIRST SCAN LINE NO
 FIRST PIXEL REFERENCE PT 1

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FIELDS TO BE CLUSTERED FOR CLASS WHEAT1

SAMPLE LINE
INC. INC.

FIELD NAME

1 ALL-F

VERTICES (SAMPLE LINE)

(1: 11 (196, 11 (196, 117) (1, 117)

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FINAL CLUSTER SUMMARY FOR CLASS WHEAT1

TOTAL NUMBER OF CLUSTERS = 13
TOTAL NUMBER OF POINTS = 22932

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| CLUSTER | SYMBOL | POINTS IN CLUSTER |
|---------|--------|-------------------|
| 1 | 1 | 477 |
| 2 | 2 | 277 |
| 3 | 3 | 4231 |
| 4 | 4 | 6501 |
| 5 | 5 | 448 |
| 6 | 6 | 2424 |
| 7 | 7 | 1295 |
| 8 | 8 | 1449 |
| 9 | 9 | 2668 |
| 10 | A | 891 |
| 11 | B | 567 |
| 12 | C | 828 |
| 13 | D | 1079 |

| CLUSTER | CH(13) | CH(14) | CH(15) | CH(16) |
|---------|--------|--------|--------|--------|
| 1 | 45.30 | 54.60 | 55.72 | 26.14 |
| 2 | 29.26 | 20.19 | 61.90 | 34.52 |
| 3 | 32.90 | 32.78 | 36.00 | 17.12 |
| 4 | 28.72 | 26.07 | 29.94 | 14.03 |
| 5 | 36.12 | 39.82 | 20.73 | 25.11 |
| 6 | 39.36 | 25.87 | 37.14 | 18.14 |
| 7 | 39.04 | 44.36 | 48.04 | 21.84 |
| 8 | 31.23 | 27.73 | 41.37 | 22.84 |
| 9 | 41.95 | 32.11 | 51.07 | 19.59 |
| 10 | 41.95 | 48.83 | 50.53 | 24.28 |
| 11 | 28.59 | 31.39 | 50.02 | 27.54 |
| 12 | 24.68 | 20.75 | 43.02 | 25.54 |
| 13 | 27.23 | | | 23.44 |

MEANS

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SISOCLS

INPUT SUMMARY

SEP 1.0
 OPTION ERCOMP
 CHANNE DATA=13,14,15,16
 CLASSE 5
 NMIN 20
 PERCEN 90
 DLMIN 3.6
 STDMAX 3.6
 SEQUEN SC
 ISTOP 12
 END

YOU HAVE SELECTED THE FOLLOWING PARAMETER VALUES AND OPTIONS

STOP AFTER 12 ITERATION(S)
 ALLOW A MINIMUM OF 20 PIXELS PER CLUSTER
 PRINT A CLUSTER SUMMARY EVERY 20 ITERATION(S)
 PRINT A CLUSTER MAP EVERY 20 ITERATION(S)
 ALLOW A MAXIMUM OF 60 CLUSTERS PER CLASS
 THE STATISTICS FILE WILL BE WRITTEN AFTER 5 CLASS(ES) HAVE BEEN CLUSTERED
 CHANNELS ARE--- 13 14 15 16
 DLMIN = 3.600
 STDMAX = 3.600
 SEP = 1.000

INPUT IMAGE DATA TAPE INFORMATION

FORMAT UNIVERSAL
 NO. OF CHANNELS 20
 NO. OF PIXELS/LINE 196
 FIRST SCAN LINE NO 1
 FIRST PIXEL REFERENCE PT 1

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FIELDS TO BE CLUSTERED FOR CLASS WHEAT!

| FIELD NAME | SAMPLE INC. | LINE INC. | VERTICES (SAMPLE,LINE) |
|------------|-------------|-----------|---|
| 1 ALL-F | 1 | 1 | (1. 1) (196. 1) (196. 117) (0. 117) |

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22 JAN 77

5-22

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FINAL CLUSTER SUMMARY FOR CLASS BNEAT1

TOTAL NUMBER OF CLUSTERS = 13
TOTAL NUMBER OF POINTS = 22932

| CLUSTER | SYMBOL | POINTS IN CLUSTER |
|---------|--------|-------------------|
| 1 | 1 | 474 |
| 2 | 2 | 277 |
| 3 | 3 | 4231 |
| 4 | 4 | 6501 |
| 5 | 5 | 448 |
| 6 | 6 | 2424 |
| 7 | 7 | 1295 |
| 8 | 8 | 1449 |
| 9 | 9 | 2668 |
| 10 | A | 591 |
| 11 | B | 567 |
| 12 | C | 628 |
| 13 | D | 1079 |

| CLUSTER | MEANS | CH(13) | CH(14) | CH(15) | CH(16) |
|---------|-------|--------|--------|--------|--------|
| 1 | 45.30 | 50.60 | 55.72 | 55.72 | 26.14 |
| 2 | 29.26 | 20.19 | 41.90 | 41.90 | 34.53 |
| 3 | 32.90 | 32.78 | 36.00 | 36.00 | 17.12 |
| 4 | 28.72 | 25.07 | 29.94 | 29.94 | 14.03 |
| 5 | 36.12 | 33.62 | 30.73 | 30.73 | 25.11 |
| 6 | 29.36 | 25.87 | 37.14 | 37.14 | 16.44 |
| 7 | 41.38 | 41.38 | 46.04 | 46.04 | 21.64 |
| 8 | 31.23 | 27.73 | 44.27 | 44.27 | 22.34 |
| 9 | 36.04 | 36.11 | 41.95 | 41.95 | 19.59 |
| 10 | 41.95 | 48.83 | 51.07 | 51.07 | 24.28 |
| 11 | 26.59 | 21.93 | 50.53 | 50.53 | 27.87 |
| 12 | 39.68 | 32.39 | 50.05 | 50.05 | 25.54 |
| 13 | 27.23 | 20.75 | 43.02 | 43.02 | 23.44 |

| CLUSTER | CH(13) | CH(14) | CH(15) | CH(16) |
|---------|--------|--------|--------|--------|
| 1 | 1.77 | 2.42 | 2.57 | 1.20 |
| 2 | 2.36 | 3.16 | 1.51 | 1.50 |
| 3 | 1.52 | 2.60 | 2.56 | 1.53 |
| 4 | 1.70 | 2.33 | 3.05 | 1.98 |
| 5 | 1.48 | 2.37 | 2.17 | 1.89 |
| 6 | 1.35 | 2.04 | 1.69 | 1.49 |
| 7 | 1.47 | 2.44 | 2.10 | 1.73 |
| 8 | 1.38 | 2.48 | 2.22 | 1.73 |
| 9 | 1.32 | 3.21 | 2.66 | 1.77 |
| 10 | 2.22 | 3.20 | 2.35 | 1.77 |
| 11 | 1.44 | 2.02 | 2.35 | 1.18 |
| 12 | 1.44 | 2.02 | 2.35 | 1.18 |
| 13 | 1.44 | 2.02 | 2.35 | 1.18 |

DISTANCES BETWEEN CLUSTERS

| CLUSTER | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1.00 | 14.90 | 15.71 | 19.36 | 5.78 | 13.18 | 7.24 | 5.74 | 11.54 | 10.14 | 11.78 | 12.74 | 13.9 |
| 2 | 14.90 | 1.00 | 12.27 | 12.86 | 7.68 | 13.99 | 8.24 | 14.24 | 11.43 | 12.84 | 17.04 | 17.04 | 17.04 |
| 3 | 15.71 | 12.27 | 1.00 | 4.00 | 12.15 | 10.52 | 13.07 | 5.07 | 11.43 | 14.94 | 14.94 | 16.00 | 17.25 |
| 4 | 19.36 | 12.86 | 4.00 | 1.00 | 14.00 | 10.52 | 13.07 | 7.22 | 9.42 | 12.22 | 10.00 | 10.00 | 11.43 |
| 5 | 5.78 | 7.68 | 12.15 | 14.00 | 1.00 | 10.52 | 7.22 | 4.00 | 7.00 | 9.42 | 12.22 | 10.00 | 11.43 |
| 6 | 13.18 | 13.99 | 10.52 | 13.07 | 10.52 | 1.00 | 11.08 | 4.00 | 7.00 | 9.42 | 12.22 | 10.00 | 11.43 |
| 7 | 7.24 | 8.24 | 13.07 | 13.07 | 7.22 | 11.08 | 1.00 | 4.00 | 7.00 | 9.42 | 12.22 | 10.00 | 11.43 |
| 8 | 5.74 | 8.24 | 13.07 | 13.07 | 4.00 | 7.22 | 4.00 | 1.00 | 5.00 | 7.00 | 9.42 | 10.00 | 11.43 |
| 9 | 11.54 | 11.43 | 9.42 | 9.42 | 7.00 | 9.42 | 7.00 | 5.00 | 1.00 | 5.00 | 7.00 | 7.00 | 7.00 |
| 10 | 10.14 | 12.84 | 14.94 | 12.22 | 12.22 | 15.73 | 11.08 | 12.00 | 10.00 | 1.00 | 3.00 | 3.00 | 3.00 |
| 11 | 11.78 | 14.94 | 14.94 | 10.00 | 12.22 | 18.74 | 14.00 | 14.00 | 12.22 | 3.00 | 1.00 | 1.00 | 1.00 |
| 12 | 12.74 | 17.04 | 16.00 | 10.00 | 10.00 | 17.74 | 14.00 | 14.00 | 12.22 | 1.00 | 1.00 | 1.00 | 1.00 |
| 13 | 13.9 | 17.04 | 17.25 | 11.43 | 11.43 | 19.61 | 14.00 | 14.00 | 12.22 | 1.00 | 1.00 | 1.00 | 1.00 |

EPIPS RUN

57 24

5 26



1840

* 04/16/19 1

CLUSTERING REPORT MENU

| CLUSTER | POPULATION | SUBCLASS MATCH | L2 DISTANCE | CLUSTER MATCH | L2 DISTANCE | DEFAULT NAME | THRESHOLD FLAG |
|---------|------------|----------------|-------------|---------------|-------------|--------------|----------------|
| 1 | 474.0 | | 0.00 | | 0.00 | | |
| 2 | 277.0 | 0 | 0.00 | | 0.00 | | |
| 3 | 6561.0 | | 0.00 | | 0.00 | | |
| 4 | 4231.0 | | 0.00 | | 0.00 | | |
| 5 | 449.0 | | 0.00 | | 0.00 | | |
| 6 | 2424.0 | | 0.00 | | 0.00 | | |
| 7 | 1499.0 | | 0.00 | | 0.00 | | |
| 8 | 1295.0 | | 0.00 | | 0.00 | | |
| 9 | 2668.0 | | 0.00 | | 0.00 | | |
| 10 | 567.0 | | 0.00 | | 0.00 | | |
| 11 | 891.0 | | 0.00 | | 0.00 | | |
| 12 | 628.0 | | 0.00 | | 0.00 | | |
| 13 | 1079.0 | | 0.00 | | 0.00 | | |

0 UNASSIGNED PIXELS

59 26

DATA

* 04/16/19 1

1840

CLUSTERING REPORT MENU

| CLUSTER | POPULATION | SUBCLASS MATCH | L2 DISTANCE | CLUSTER MATCH | L2 DISTANCE | DEFAULT NAME | THRESHOLD FLAG |
|---------|------------|----------------|-------------|---------------|-------------|--------------|----------------|
| 1 | 474.0 | | 0.00 | | 0.00 | | |
| 2 | 277.0 | 0 | 0.00 | | 0.00 | | |
| 3 | 6561.0 | | 0.00 | | 0.00 | | |
| 4 | 4231.0 | | 0.00 | | 0.00 | | |
| 5 | 449.0 | | 0.00 | | 0.00 | | |
| 6 | 2424.0 | | 0.00 | | 0.00 | | |
| 7 | 1449.0 | | 0.00 | | 0.00 | | |
| 8 | 1295.0 | | 0.00 | | 0.00 | | |
| 9 | 2668.0 | | 0.00 | | 0.00 | | |
| 10 | 567.0 | | 0.00 | | 0.00 | | |
| 11 | 991.0 | | 0.00 | | 0.00 | | |
| 12 | 628.0 | | 0.00 | | 0.00 | | |
| 13 | 1079.0 | | 0.00 | | 0.00 | | |

0 UNASSIGNED PIXELS

5-10-27

04/16/01 1

1305

DETAILED CLUSTERING REPORT

| RUN NO. | CLUSTER 1 | | CLUSTER 2 | | CLUSTER 3 | | CLUSTER 4 | | CLUSTER 5 | |
|---------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|-----------|--------|
| | C OF | S FROM | C OF | S FROM | C OF | S FROM | C OF | S FROM | C OF | S FROM |
| 1 | 45.30 | 1.77 | 29.26 | 3.36 | 28.72 | 1.70 | 32.50 | 1.62 | 23.10 | 1.30 |
| 13 | 54.59 | 2.49 | 20.19 | 3.43 | 26.07 | 2.50 | 32.78 | 2.16 | 39.83 | 1.52 |
| 14 | 55.72 | 2.57 | 61.90 | 4.52 | 29.94 | 2.70 | 36.00 | 2.56 | 39.73 | 1.38 |
| 15 | 26.14 | 1.29 | 34.53 | 3.00 | 14.03 | 1.83 | 17.12 | 1.50 | 25.11 | 1.90 |

| DIFF | 0.95 | 1.41 | 0.50 | 0.30 | 0.30 |
|----------|------|-------|------|------|------|
| DISTANCE | 6.46 | 10.15 | 6.60 | 6.30 | 7.10 |
| MEAN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| STDEV | | | | | |

ORIGINAL PAGE IS OF POOR QUALITY

5-10-77

* 04/18/01 1

DETAILED CLUSTERING REPORT

1305

| RUN NO. | CLUSTER 1 C OF 0/0 S FROM 0 | CLUSTER 2 C OF 0/0 S FROM 0 | CLUSTER 3 C OF 0/0 S FROM 0 | CLUSTER 4 C OF 0/0 S FROM 0 | CLUSTER 5 C OF 0/0 S FROM 0 |
|---------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 13 | MEAN 45.30 STD 1.77 | MEAN 29.26 STD 3.36 | MEAN 28.72 STD 1.78 | MEAN 32.50 STD 1.52 | MEAN 28.15 STD 1.29 |
| 14 | MEAN 54.89 STD 2.49 | MEAN 20.19 STD 3.43 | MEAN 26.97 STD 2.80 | MEAN 32.78 STD 2.16 | MEAN 39.03 STD 0.55 |
| 15 | MEAN 55.72 STD 2.57 | MEAN 61.90 STD 4.52 | MEAN 29.94 STD 2.70 | MEAN 26.00 STD 2.56 | MEAN 39.71 STD 0.55 |
| 16 | MEAN 26.14 STD 1.29 | MEAN 34.53 STD 3.00 | MEAN 14.03 STD 1.85 | MEAN 17.12 STD 1.50 | MEAN 25.11 STD 1.50 |

| DIFF | 0.35 | 1.41 | 0.57 | 6.90 | 0.33 |
|----------|------|-------|------|------|------|
| DISTANCE | | | | | |
| MEAN | 6.46 | 10.15 | 6.60 | 6.30 | 7.00 |
| STDEV | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

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OF POOR QUALITY

* 04/18/15 1

DETAILED CLUSTERING REPORT

1805

| RUN NO. | CHANNELS | CLUSTER 6 C OF 0/0 S FROM 0 | CLUSTER 7 C OF 0/0 S FROM 0 | CLUSTER 8 C OF 0/0 S FROM 0 | CLUSTER 9 C OF 0/0 S FROM 0 | CLUSTER 10 C OF 0/0 S FROM 0 |
|---------|----------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|------------------------------------|
| | MEAN | STD | MEAN | STD | MEAN | STD |
| 13 | 29.36 | 1.48 | 31.23 | 1.47 | 39.04 | 1.35 |
| 14 | 25.87 | 2.37 | 27.73 | 2.44 | 44.38 | 2.05 |
| 15 | 37.14 | 2.17 | 44.37 | 2.10 | 46.04 | 1.89 |
| 16 | 18.44 | 1.48 | 22.84 | 1.69 | 21.89 | 1.19 |

| DIFF | 1.08 | 1.00 | 1.08 | 0.96 | 0.28 |
|----------|------|------|------|------|------|
| DISTANCE | 6.32 | 6.22 | 5.19 | 6.02 | 7.91 |
| MEAN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| STDEV | | | | | |

| CLUSTER 11 C OF 0/0 S FROM 0 | CLUSTER 12 C OF 0/0 S FROM 0 |
|------------------------------------|------------------------------------|
| MEAN | STD |
| 24.59 | 2.02 |
| 21.93 | 2.02 |
| 58.53 | 2.13 |
| 27.87 | 1.13 |

68 275



1905 * 04/18/21 1

DETAILED CLUSTERING REPORT

| RUN NO. | CLUSTER 11 C OF 0/0 S FROM 0 | CLUSTER 12 C OF 0/0 S FROM 0 | CLUSTER 13 C OF 0/0 S FROM 0 |
|---------|------------------------------------|------------------------------------|------------------------------------|
| 13 | 41.95 1.39 | 34.68 1.44 | 27.23 1.43 |
| 14 | 48.83 1.98 | 32.39 2.36 | 28.75 2.28 |
| 16 | 51.07 2.22 | 60.06 3.36 | 43.02 2.36 |
| 16 | 24.28 1.33 | 25.54 2.11 | 23.44 1.64 |

| CHANNELS | MEAN | STD | MEAN | STD | MEAN | STD |
|----------|------|-----|------|-----|------|-----|
| DIFF | 0.67 | | 0.44 | | 1.23 | |
| DISTANCE | 5.30 | | 7.41 | | 6.46 | |
| MEAN | 0.90 | | 0.08 | | 0.00 | |
| STDEV | | | | | | |

60 275

* 04/13/21 *

DETAILED CLUSTERING REPORT

1805

| RUN NO. | CLUSTER 11 | | | CLUSTER 12 | | | CLUSTER 13 | | |
|---------|------------|--------|-----|------------|--------|-----|------------|--------|-----|
| | C OF | S FROM | STD | C OF | S FROM | STD | C OF | S FROM | STD |
| 1 | 41.95 | 1.39 | | 34.68 | 1.44 | | 27.23 | 1.43 | |
| 13 | 48.83 | 1.98 | | 32.39 | 2.36 | | 29.75 | 2.28 | |
| 14 | 51.07 | 2.22 | | 60.06 | 3.36 | | 43.02 | 2.35 | |
| 16 | 24.28 | 1.33 | | 25.54 | 2.11 | | 23.44 | 1.84 | |

| DIFF | 0.67 | 0.44 | 1.23 |
|----------|------|------|------|
| DISTANCE | 5.30 | 7.41 | 6.46 |
| MEAN | 0.99 | 0.00 | 0.00 |
| STDEV | | | |

6. TEST APPROVAL SHEET

UNIVAC 1108 LARSYS/ISOCLS MODIFICATIONS
FOR
LACIE PHASE III
Job Order 71-695
(TIRF 76-0086)

Verification Test Specification

APPROVAL SHEET

| | | | |
|---------------------------|-----------------------|-------|------------------|
| TEST CONDUCTOR: | _____ | DATE: | _____ |
| COGNIZANT ENGINEER: | <u>B. Skilla</u> | DATE: | <u>2/10/77</u> |
| REQUIREMENTS: | <u>J.C. Mentis</u> | DATE: | <u>2/10/77</u> |
| USER: | <u>J.C. Mentis</u> | DATE: | <u>2/10/77</u> |
| NASA TECHNICAL MONITOR: | <u>M C Trichel</u> | DATE: | <u>10 Feb 77</u> |
| MAINTENANCE & OPERATIONS: | _____ | DATE: | _____ |
| LACIE QUALITY ASSURANCE: | _____ | DATE: | _____ |
| QUALITY ASSURANCE: | <u>W. [Signature]</u> | DATE: | <u>10 Feb 77</u> |

REMARKS: _____

6. TEST APPROVAL SHEET

UNIVAC 1108 LARSYS/ISOCLS MODIFICATIONS
FOR
LACIE PHASE III
Job Order 71-695
(TIRF 76-0086)

Verification Test Specification

APPROVAL SHEET

| | | | |
|---------------------------|-----------------------|-------|------------------|
| TEST CONDUCTOR: | _____ | DATE: | _____ |
| COGNIZANT ENGINEER: | <u>B. Skilla</u> | DATE: | <u>2/10/77</u> |
| REQUIREMENTS: | <u>J. C. Mentis</u> | DATE: | <u>2/10/77</u> |
| USER: | <u>J. C. Mentis</u> | DATE: | <u>2/10/77</u> |
| NASA TECHNICAL MONITOR: | <u>M C Trickett</u> | DATE: | <u>10 Feb 77</u> |
| MAINTENANCE & OPERATIONS: | _____ | DATE: | _____ |
| LACIE QUALITY ASSURANCE: | _____ | DATE: | _____ |
| QUALITY ASSURANCE: | <u>W. [Signature]</u> | DATE: | <u>10 Feb 77</u> |

REMARKS: _____

APPENDIX A
PROGRAM LISTING

APPENDIX A
PROGRAM LISTING

```

10 I 027313 KPLCE
11 I 027301 LAST
12 I 000100 MAPFIL
13 I 000136 MAACLS
14 I 000075 MHSFUN
15 I 000135 NOFEAT
16 I 000425 NOSUB2
17 I 000070 PAGESIZ
18 I 000077 STRNTR
19 I 000010 STPRIG
20 I 000127 TOTSUB
21 I 000271 VARSIZ
0003 I 000012 KPTS
0003 I 000001 LNCAT
0003 I 000274 MAPFMT
0003 I 027277 MAXDIM
0003 I 000002 MNFILE
0003 I 000133 NVRT
0003 I 000322 PERCEN
0003 I 000006 SEP
0003 I 000074 STAFIL
0003 I 000331 SUBVEC
0003 I 000131 TOTVRT
0003 I 000003 KRM
0003 I 027323 LSTAT
0003 I 000275 MAPKEY
0003 I 027303 MEANSI
0003 I 000464 NOCHAN
0003 I 000121 NOFLD
0003 I 000112 NROS
0003 I 000330 PHIN
0003 I 000276 SEQUEN
0003 I 000175 STMTKY
0003 I 000175 SYMTRX
0003 I 000123 TOTWRD
0000 I 027316 KY
0000 I 027315 LI
0004 I 000052 MAPTAP
0004 I 000125 MCLASS
0003 I 000132 NOCLS
0003 I 000013 NXPCLS
0004 I 000134 NXPCLS
0004 I 000014 NXPCLS
0000 I 000323 SIMEMF
0000 I 027304 STDEVI
0003 I 000130 TOTFLD
0000 I 000061 TRFORM
000000 KVAL
000007 MAPL
000064 MAPS1
000076 RMS1
000126 NGCL
000466 NGSE
027302 NI
000054 SAVI
027314 SMI
000004 STDF
000124 TOTF
027305 TTRF

```

SUBROUTINE ISOCLS(ARRAY, TOP)

THIS PROGRAM PERFORMS A MODIFIED VERSION OF THE CLUSTERING ALGORITHM (ISODATA) ORIGINALLY DEVELOPED BY BALL AND HALL OF STANFORD RESEARCH INSTITUTE. THE ALGORITHM HAS BEEN MODIFIED ON THE RECOMMENDATIONS OF ED KAN (LEC).

THE PROGRAM EXPECTS MULTISPECTRAL SCANNER DATA IN EITHER THE LAKSYS 22 OR THE UNIVERSAL FORMAT. THE DATA TAPE SHOULD BE ASSIGNED TO FORTRAN UNIT 3.

```

INCLUDE COMBKS,LIST
PARAMETER MAXPOP=60,MAXFETI=30
COMMON/PASS/STOP,LNCAT,NNIN,KAN,STOMAX,OLMIN,SEP,
MAP,SPTRIG,IND,KPTS,NOPTS,BEGINI,
ICHM,CHNTHS,ICHAIN(MAXPOP),NOSD,IBEGIN,BEGINI,
BEGIN2,BEGIN3,CLSFRM,NOFLD,IPT,TOTWRD,TOTPTS,
MCLASS,NOCLS,TOTSUB,TOTFLD,TOTVRT,NOCL,NVRT,
MATICLS,NOFEAT,MAACLS,FEIVEC(30),SYMTRX(60)
*,VARSIZ,STATKY,ISOKEY,HAPFMT,MAPKEY,SEQUEN(20),PERCEN,SIMERP
*,ORDER,INUNIT,TRFILE,TRPHIN,SUBVEC(60),NOSUB2,CHNVC(30)
*,NOCHAN,ERCOMP,NOSEL
IMPLICIT INTEGER (A-X)
END

```

INCLUDE COMNTS,LIST

COMMON BLOCK *PASS* IS USED ONLY BY THE ISOCLS PROCESSOR.

ISOCLS USES THE RANDOM ACCESS DRUM FILE AS FOUR DISTINCT FILES. SEE DEFINITIONS OF IBEGIN,BEGINI,BEGIN2,BEGIN3 BELOW

DEFINITIONS

```

ISTOP - MAX. NO. OF ITERATIONS FOR THE CLUSTERING PROCEDURE
LNCAT - CURRENT NO. OF CLUSTERS. SET INITIALLY IN RDFILE OR ISOCLS
        - ISOCLS, THEN ONLY IN ISODAT.

```

```

ISOCL00010
ISOCL00020
ISOCL00030
ISOCL00040
ISOCL00050
ISOCL00060
ISOCL00070
ISOCL00080
ISOCL00090
ISOCL00100
ISOCL00110
ISOCL00120
ISOCL00130
ISOCL00140
ISOCL00150

```

```

*LEN
*NER
*--1

```

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```

10 I 027313 KPLCE
11 I 027301 LAST
12 I 000100 MAPFIL
13 I 000136 MAXCLS
14 I 000075 MAXFUN
15 I 000135 MAXFEAT
16 I 000425 NOSUB2
17 I 000070 PAGESIZ
18 I 000077 SCTRUN
19 I 000010 SPTRIG
20 I 000020 STUP
21 I 000127 TOTSUB
22 I 000271 VARSIZ
0003 I 000012 KPIS
0003 I 000001 LRCAT
0003 I 000274 HARPFMT
0003 I 027277 MAXDIM
0003 I 000065 NOFILE
0003 I 000133 NVRT
0003 I 000322 PERCEN
0003 I 000006 SEP
0004 I 000072 STAFIL
0003 I 000331 SUBVEC
0003 I 000131 TOTVRT
0003 I 000003 KRM
0003 I 027303 LSTAT
0003 I 000275 MAPKEY
0003 I 027303 MEANS1
0003 I 000161 NOCHAN
0003 I 000121 NOFLD
0003 I 000112 NPOS
0003 I 000330 PKNIN
0003 I 000276 SEQUEN
0003 I 000175 STATKY
0003 I 000123 TOTWRD
0000 I 027316 KY
0000 I 027315 LI
0004 I 000052 MAPYAP
0004 I 000125 MCLASS
0003 I 000132 NOCLS
0003 I 000013 NOPTS
0004 I 000124 NXTCLS
0004 I 000014 PUNCH
0000 I 000323 SIMERF
0000 I 027304 STOF
0003 I 000124 TOTF
0000 I 027305 TRFORM
0000 I 000000 KVAL
0000 I 000007 MAPL
0000 I 000064 MASI
0000 I 000076 NCCL
0000 I 000126 NOSE
0000 I 000466 NI
0000 I 027302 NI
0000 I 000054 SAVI
0000 I 027314 SMI
0000 I 000004 STOF
0000 I 000124 TOTF
0000 I 027305 TRFORM

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SUBROUTINE ISOCLS(ARRAY, TOP)

THIS PROGRAM PERFORMS A MODIFIED VERSION OF THE CLUSTERING ALGORITHM (ISODATA) ORIGINALLY DEVELOPED BY BALL AND HALL OF STANFORD RESEARCH INSTITUTE. THE ALGORITHM HAS BEEN MODIFIED ON THE RECOMMENDATIONS OF ED KAN (LEC).

THE PROGRAM EXPECTS MULTISPECTRAL SCANNER DATA IN EITHER THE LARSYS 22 OR THE UNIVERSAL FORMAT. THE DATA TAPE SHOULD BE ASSIGNED TO FORTRAN UNIT 3.

INCLUDE COMBKS, LIST
PARAMETER MAXPOP=60, MAXFEYI=30
COMMON/PASS/SIOP, LNCAT, NNIN, KRN, STOMAX, DLMIN, SEP,
, ICHN, CHNTHS, ICHAIN(MAXPOP), NPOS, IBEGIN, BEGIN1,
, BEGIN2, BEGIN3, CLSMAN, NOFLD, IPT, TOTWRD, TOTPTS,
, NCLASS, NOCLS, TOTSUB, TOTVNT, NOCL, NVRT
, MATCLS, NOFEAT, MAXCLS, FEIVEC(30), SYMTEX(60)
, VARSIZ, STATKY, ISOKEY, MAPFMT, MAPKEY, SEQUEN(20), PERCEN, SIMERP
, STORDER, INUNIT, INFILE, INITH, PMIN, SUBVEC(60), NOSUB2, CHNVC(30)
, NOCHAN, ERCOMP, NOSEV
IMPLICIT INTEGER (A-X)
END

INCLUDE COMNTS, LIST

COMMON BLOCK 'PASS' IS USED ONLY BY THE ISOCLS PROCESSOR.

ISOCLS USES THE RANDOM ACCESS DRUM FILE AS FOUR DISTINCT FILES. SEE DEFINITIONS OF IBEGIN, BEGIN1, BEGIN2, BEGIN3 BELOW

DEFINITIONS

ISTOP - MAX. NO. OF ITERATIONS FOR THE CLUSTERING PROCEDURE SET IN SETUP7 ROUTINE. (USER INPUT)
LNCAT - CURRENT NO. OF CLUSTERS. SET INITIALLY IN ROFILE OR ISOCLS ISOCLS. THEN ONLY IN ISODAT.

ORIGINAL PAGE IS
OF POOR QUALITY

170 -- MIN. NO. OF POINTS TO ALLOW PER CLUSTER
170 -- SET IN SETUP7 ROUTINE. (USER INPUT) ITERATION(S)
170 -- PRM1 CLUSTER SUMMARY EVERY *KRN* ITERATION(S)
170 -- SET IN SETUP7 ROUTINE. (USER INPUT)
170 -- STANDARD DEVIATION FOR SPLITTING CLUSTERS
170 -- SET IN SETUP7 ROUTINE. (USER INPUT)
170 -- MIN. DISTANCE BETWEEN CLUSTERS FOR COMBINING.
170 -- DISTANCE TO SEPARATE CLUSTERS. SET EIGMER IN SETUP7.
170 -- BY USER INPUT; OR IN ID
170 -- BY USER INPUT; OR IN ISODAT.
170 -- PRINT A CLUSTER MAP EVERY *MAP* ITERATION(S) - SETUP7
170 -- TRIGGER TELLING WHETHER OR NOT *SEP* WAS INPUT. - SETUP7
170 -- NO. OF RECORDS TO READ FROM DATA FILE. COMPUTED IN
170 -- ISUCLS
170 -- NO. OF POINTS IN EACH RECORD. COMPUTER IN ISUCLS
170 -- NO. OF POINTS IN LAST RECORD. COMPUTER IN ISUCLS
170 -- TRIGGER TELLING WHETHER OR NOT TO PUNCH THE MODULE
170 -- STAT DECK. - SETUP7
170 -- TRIGGER TELLING WHETHER OR NOT CHAINING IS TO BE DONE
170 -- MIN. DISTANCE BETWEEN CHAINED CLUSTERS FOR CHAINING - SETUP7
170 -- ARRAY CONTAINING CHAINED CLUSTER NUMBERS. SET IN
170 -- *PCMAIN* ROUTINE.
170 -- TOTAL NO. OF WORDS AVAILABLE FOR DRUM STORAGE OF
170 -- IMAGE DATA TO BE CLUSTERED. - SET IN ISUCLS
170 -- BEGINNING DRUM FILE ADDRESS FOR INPUT INITIAL CLUSTER
170 -- CENTERS - SET IN ISUCLS
170 -- BEGINNING DRUM FILE ADDRESS FOR TEMPORARY STORAGE OF
170 -- CLASS STATISTICS - SET IN ISUCLS ROUTINE
170 -- BEGINNING DRUM FILE ADDRESS FOR IMAGE DATA
170 -- BEGINNING DRUM FILE ADDRESS FOR *PLACE* (CLUSTER TO
170 -- WHICH CORRESPONDING POINT BELONGS.)
170 -- NAME OF CLASS CURRENTLY BEING PROCESSED. - RDDATA
170 -- NO. OF FIELDS INPUT FOR THIS CLASS - RDDATA
170 -- NO. OF WORDS OF STORAGE USED IN *ARRAY* FOR FIELD AND
170 -- CLASS INFORMATION FOR THIS CLASS. - RDDATA
170 -- TOTAL WORDS WRITTEN ON DRUM FILE BEGINNING AT ADDRESS
170 -- BEGIN - RDDATA
170 -- TOTAL POINTS TO BE CLUSTERED FOR CURRENT CLASS - RDDATA
170 -- NO. OF CLASSES TO BE CLUSTERED FOR CURRENT CALL TO
170 -- ISUCLS. USER INPUT - SETUP7.
170 -- CURRENT CLASS NO. - ISUCLS
170 -- TOTAL CLUSTERS FOR THIS CALL TO ISUCLS
170 -- TOTAL FIELDS FOR ALL CLASSES - ISUCLS
170 -- TOTAL VERTICES FOR ALL FIELDS - ISUCLS
170 -- NO. OF CLASSES SINCE LAST CALL TO SETUP - RDDATA
170 -- NO. OF VERTICES FOR ALL FIELDS IN CURRENT CLASS
170 -- NAME OF NEXT CLASS (RDDATA)
170 -- FORMAT OF OUTPUT MAP TAPE
170 -- NO. OF CHANNELS USED IN CLUSTERING
170 -- MAX. NO. OF CLUSTERS PER CLASS
170 -- CHANNELS USED IN CLUSTERING
170 -- SYMBOLS FOR PRINTING MAP
170 -- SIZE OF EACH CLUSTER'S COVARIANCE MATRIX
170 -- STATY - FLAG FOR PRINTING COVARIANCES.
170 -- MAPKEY - INDICATES WHETHER TO USE MEAN VECTOR OR CLUSTER NUMBER
170 -- IN MAP TAPE
170 -- SEQUEN - ARRAY CONTAINING SEQUENCE OF *S* AND *C* CHARACTERS FOR
170 -- SPLIT-COMBINE ITERATION CONTROL.

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|-----|---|--------|---|---|
| 170 | C | MMIN | - | MIN. NO. OF POINTS TO ALLOW PER CLUSTER |
| 171 | C | KRN | - | SET IN SETUP7 ROUTINE. (USER INPUT) ITERATION(S) |
| 172 | C | STDMAX | - | PRINT CLUSTER SUMMARY EVERY 'KRN' ITERATION(S) |
| 173 | C | DLMIN | - | SET IN SETUP7 ROUTINE. (USER INPUT) |
| 174 | C | SEP | - | STANDARD DEVIATION FOR SPLITTING CLUSTERS |
| 175 | C | MAP | - | SET IN SETUP7 ROUTINE. (USER INPUT) |
| 176 | C | SPTRIG | - | MIN. DISTANCE BETWEEN CLUSTERS. SET EITHER IN SETUP7 |
| 177 | C | IRK | - | DISTANCE TO SEPARATE CLUSTERS. SET EITHER IN SETUP7 |
| 178 | C | NOPTS | - | BY USER INPUT; OR IN 'ISODAT' |
| 179 | C | KPTS | - | PRINT A CLUSTER MAP EVERY 'MAP' ITERATION(S) - SETUP7 |
| 180 | C | PUNCH | - | TRIGGER TELLING WHETHER OR NOT 'SEP' WAS INPUT. - SETUP7 |
| 181 | C | ICHN | - | TRIGGER TELLING WHETHER OR NOT CHAINING IS TO BE DONE |
| 182 | C | ICHTMS | - | MIN. DISTANCE BETWEEN CLUSTERS FOR CHAINING - SETUP7 |
| 183 | C | ICHAIN | - | ARRAY CONTAINING CHAINED CLUSTER NUMBERS. SET IN 'CMAIN' ROUTINE. |
| 184 | C | NWDS | - | TOTAL NO. OF WORDS AVAILABLE FOR DRUM STORAGE OF IMAGE DATA TO BE CLUSTERED - SET IN 'ISOCLS' |
| 185 | C | IBEGIN | - | BEGINNING DRUM FILE ADDRESS FOR INPUT INITIAL CLUSTER |
| 186 | C | BEGINS | - | BEGINNING DRUM FILE ADDRESS FOR TEMPORARY STORAGE OF CLASS STATISTICS - SET IN 'ISOCLS' |
| 187 | C | BEGIN1 | - | BEGINNING DRUM FILE ADDRESS FOR 'ISOCLS' ROUTINE |
| 188 | C | BEGIN2 | - | BEGINNING DRUM FILE ADDRESS FOR 'IMAGE DATA' WHICH CORRESPONDING POINT BELONGS.) |
| 189 | C | CLSNAM | - | NAME OF CLASS CURRENTLY BEING PROCESSED. - RDATA |
| 190 | C | NOFLD | - | NO. OF FIELDS INPUT FOR THIS CLASS - RDATA |
| 191 | C | IPT | - | NO. OF WORDS OF STORAGE USED IN 'ARRAY' FOR FIELD AND CLASS INFORMATION FOR THIS CLASS. - RDATA |
| 192 | C | TOTWRD | - | TOTAL WORDS WRITTEN ON DRUM FILE BEGINNING AT ADDRESS BEGIN1 - RDATA |
| 193 | C | TOTPTS | - | TOTAL POINTS TO BE CLUSTERED FOR CURRENT CLASS - RDATA |
| 194 | C | NCLASS | - | NO. OF CLASSES TO BE CLUSTERED FOR CURRENT CALL TO 'ISOCLS' - USER INPUT - SETUP7. |
| 195 | C | NOCLS | - | CURRENT CLASS NO. - 'ISOCLS' |
| 196 | C | TOTSUB | - | TOTAL CLUSTERS FOR THIS CALL TO 'ISOCLS' |
| 197 | C | TOTFLD | - | TOTAL FIELDS FOR ALL CLASSES - 'ISOCLS' |
| 198 | C | TOTVRT | - | TOTAL VERTICES FOR ALL FIELDS - 'ISOCLS' |
| 199 | C | NUCL | - | NO. OF CLASSES SINCE LAST CALL TO SETUP - RDATA |
| 200 | C | NVRT | - | NO. OF VERTICES FOR ALL FIELDS IN CURRENT CLASS |
| 201 | C | MAXCLS | - | NAME OF NEXT CLASS ('RDATA') |
| 202 | C | MAPFMT | - | FORMAT OF OUTPUT MAP TAPE |
| 203 | C | NOFEAT | - | NO. OF CHANNELS USED IN CLUSTERING |
| 204 | C | MAXCLS | - | MAX. NO. OF CLUSTERS PER CLASS |
| 205 | C | FETVEC | - | CHANNELS USED IN CLUSTERING |
| 206 | C | SYNTAX | - | SYMBOLS FOR PRINTING MAP |
| 207 | C | VARSI2 | - | SIZE OF EACH CLUSTER'S COVARIANCE MATRIX |
| 208 | C | STAPK1 | - | FLAG FOR PRINTING COVARIANCES. |
| 209 | C | MAPKEY | - | INDICATES WHETHER TO USE MEAN VECTOR OR CLUSTER NUMBER IN MAP TAPE |
| 210 | C | SEQUEN | - | ARRAY CONTAINING SEQUENCE OF 'S' AND 'C' CHARACTERS FOR SPLIT-COMBINE ITERATION CONTROL. |
| 211 | C | | | |
| 212 | C | | | |

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170 PERCENT-CUT OFF PERCENTAGE FOR STABILIZED CLUSTERS IN INITIAL
171 SEQUENCE.
172 SIMERP--TRIGGER FOR SIMULATING CRIPS CLUSTERING ALGORITHM.
173 SIMERP=1 SIMULATE CRIPS--SIMERP=0 STANDARD ISOCLS
174 ORDER--TRIGGER FOR ORDERING THE COLOR KEYS BASED ON THE MARKING
175 OF GREENNESS OF EACH CLUSTER AS COMPUTED BY THE SUBROUTINE
176 KAWK*SET IN SETUP7.
177 INUNIT--UNIT NUMBER FOR INPUT STATISTICS FILE.
178 INFILE--FILE NUMBER FOR INPUT STATISTICS FILE.
179 INITH--TRIGGER FOR INITIAL MEANS FROM STATISTICS FILE.
180 PHIN--POPULATION MINIMUM FOR EACH CLUSTER.
181 NUFEAT.
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END
 INCLUDE COMBK6,LIST
 COMMON/GLOBAL/HEAD(42),MAPTAP,DATEP,SAVE,TAP,BMFILE,BMKEY,
 HISFIL,HISKEY,TRFORM,ERIP,ERPKEY,MAPUNT,NOFILE,
 DRUMAD,DRMADS,PAGSIZ,DAFIL,STAFIL,ASAV,ASAVFL,
 NHSTUN,NHSTFI,SCTRUN,MAPFIL
 LND
 PARAMETER KVARUM = 11500
 DIMENSION KVAR(KVARUM)
 DIMENSION ARRAY(1)
 DIMENSION COVAR(465)
 IBEGIN=DRUMAD
 RESERVE ENOUGH DRUM STORAGE FOR MAXIMUM INITIAL MEANS
 BEGIN3=IBEGIN + MAXPOP*HXFET1 + HXFET1 + 2
 CALL SETUP TO READ CARD INPUT AND INITIALIZE DEFAULT VALUES
 ITIME=1
 NOCLS = 0
 TOTFLD = 0
 TOTVRT = 0
 TOTSUB = 0
 CORBAS=1
 CALL SETUP7(ARRAY(CORBAS),TOP,ITIME)
 IF ITIME.GT.1160 TO 2
 VARSIZ=NOFEAT*(NOFEAT+1)/2
 BEGIN1 = BEGIN3 + NCLASS*MAXPOP*(VARSIZ + NOFEAT + 1)
 NADS=DRMADS-(BEGIN1-DRUMAD)
 ITIME=ITIME+1
 NOCL=0
 CALL RDDATA TO COORDINATE READING OF DATA
 MAXDIM = TOP-CORBAS
 FDI=CORBAS
 CALL RDDATA(ARRAY(FDI),MAXDIM,KVAR,KVARCH,LAST,
 BEGIN2=BEGIN1 + IGTBRD
 NI = FDI + IPT
 MEANS1=NI + MAXCLS
 STDEV1=MEANS1 + MAXCLS*NOFEAT
 ITOP = STDEV1 + MAXCLS*NOFEAT
 MAXDIM=TOP-ITOP

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170 PERCENT-CUT OFF PERCENTAGE FOR STABILIZED CLUSTERS IN INITIAL
171 SEQUENCE.
172 SIMERP-TRIGGER FOR SIMULATING ERIPS CLUSTERING ALGORITHM.
173 SIMERP=1 SIMULATE ERIPS-SIMERP=0 STANDARD ISOCLS
174 ORDER--TRIGGER FOR ORDERING THE COLOR KEYS BASED ON THE RANKING
175 OF GREENNESS OF EACH CLUSTER AS COMPUTED BY THE SUBROUTINE
176 RANK.SET IN SETUP7.
177 INUNIT--WAIT NUMBER FOR INPUT STATISTICS FILE.
178 INFILE--FILE NUMBER FOR INPUT STATISTICS FILE.
179 INITM--TRIGGER FOR INITIAL HEAMS FROM STATISTICS FILE.
180 PHIN--POPULATION MINIMUM FOR EACH CLUSTER.
181 NOFEAT.
182
183 END
184 (INCLUDE COMBK6,LIST
185 COMMON/GLOBAL/HEAD(42),MARTAP,DATEP,SAVTAP,BMFILE,BMKEY,
186 HISFIL,HISKEY,IRFORM,IRIP,IRKEY,HAPUNT,NOFILE,
187 DRUMAD,DRMWD5,PAGSIZ,DATFIL,STAFIL,ASAV,ASAVFL
188 ,NHSTUN,NHSTFI,SCTRUN,MAPFIL
189 LND
190 PARAMETER KVARUM = 11500
191 DIMENSION KVAR(KVARUM)
192 DIMENSION ARRAY(1)
193 DIMENSION COVAR(465)
194 IBEGIN=DRUMAD
195
196 RESERVE ENOUGH DRUM STORAGE FOR MAXIMUM INITIAL MEANS
197
198 BEGIN3=IBEGIN + MAXPOP*HXFE1 + HXFE1 + 2
199
200 CALL SETUP TO READ CARD INPUT AND INITIALIZE DEFAULT VALUES
201
202 ITIME=1
203 NOCLS = 0
204 TOTFLD = 0
205 TOTVRT = 0
206 TOTSUB = 0
207
208 CORBAS=1
209
210 CALL SETUP7(ARRAY(CORBAS),TOP,ITIME)
211
212 IF(ITIME.GT.1)GO TO 2
213 VARSIZ=NOFEAT*(NOFEAT+1)/2
214 BEGIN1 = BEGIN3 + NCLASS*MAXPOP*(VARSIZ + NOFEAT + 1)
215 NRD5=DRMWD5-(BEGIN1-DRUMAD)
216 ITIME=ITIME+1
217
218 NOCL=0
219
220 CALL RODATA TO COORDINATE READING OF DATA
221
222 MAXDIM = TOP-CORBAS
223 FDI=CORBAS
224 CALL RODATA(LARKAY(FDI),MAXDIM,KVAR,KYARDM,LAST)
225 BEGIN2=BEGIN1 + TOTRD
226 NI = FDI + IPT
227 HEAMS1=MI + MAXCLS
228 STDEV1=HEAMS1 + MAXCLS*NOFEAT
229 MAXDIM=TOP-TTOP
230
231
232
233
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253
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150C0330
150C0330
150C0350

150C0370
150C0390

•NEW
•••-1

•NEW

•NEW
•NEW
•NEW
•NEW

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56 NPTS = MAXDIM/(NUFEAT+1)
57 IDATI = TTOP
58 IF (ISUKEY.EQ.1) GO TO 7
59 SUBVEC=SUBCLASSES FROM STATISTICS FILE FOR INITIAL MEANS.
60 SUBURZ=NUMBER OF INITIAL MEANS.
61 CHMVEC=NUMBER OF CHANNELS FROM STATISTICS FILE. NOCHAN MUST EQUAL
62 IF (LIMITH.EQ.1) GO TO 6
63 LNCAT=1
64 GO TO 8
65 LNCAT=MSUB2
66 CALL GETSTA(INUMIT,INFILE,ARRAY(MEANS),DUM,NOSUB2,SUBVEC,NOCHAN
67 ,CHMVC,ARRAY(TTOP),COVAR,0)
68 GO TO 8
69 CONTINUE
70 IF (ISUKEY.EQ.1) CALL XDFILE(ARRAY(MEANS),ARRAY(TTOP))
71 CONTINUE
72 IF (NPTS.GE.1) GO TO 10
73 WRITE(6,10) MAXDIM
74 FORMAT(10 DIMENSION LIMITS EXCEEDED IN ISOCLS BY',16,
75 , REDUCE CHANNELS OR MAX-CLUSTERS)
76 CALL CHECKK
77 CONTINUE
78 IRU=TOTPTS/NPTS
79 IF (MOD(TOTPTS,NPTS).EQ.0) GO TO 20
80 KPTS=MOD(TOTPTS,NPTS)
81 IRD=IRD+1
82 IF (IRD.EQ.1) NPTS=KPTS
83 GO TO 25
84 NPTS=NPTS
85 CONTINUE
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100 CALL ISOQAT TO PERFORM CLUSTERING
101
102
103
104
105
106
107
108
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111
112
113

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ISOQ0910
ISOQ0920
ISOQ0930

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ISOQ0550
ISOQ0560
ISOQ0570
ISOQ0590
ISOQ0600
ISOQ0610

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ISOQ0630
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```

36 NPTS = MAXDIM/NUFEAT+1
37 IDATI = ITOP
38 IF (ISORKEY.EQ.1) GO TO 7
39 SUBVEC-SUBCLASSES FROM STATISTICS FILE FOR INTIAL MEANS.
40 NOSUB2-NUMBER OF INITIAL MEANS
41 CHNVEC-NUMBER OF CHANNELS FROM STATISTICS FILE. NOCHAN MUST EQUAL
42 IF (LIMITH.EQ.1) GO TO 6
43 LMCAT=1
44 GO TO 8
45 LNCAT=NOSUB2
46 CALL GETSTA(INUNIT,INFILE,ARRAY(MEANS)),DUM,NOSUB2,SUBVEC,NOCHAN
47 *CHNVC,ARRAY(ITOP),COVAR,IO
48 GO TO 8
49 CONTINUE
50 IF (ISORKEY.EQ.1) CALL PROFILE(ARRAY(MEANS)),ARRAY(ITOP))
51 CONTINUE
52 IF (NPTS.GT.0) GO TO 10
53 WRITE(6,10)MAXDIM
54 100 FORMAT(' DIMENSION LIMITS EXCEEDED IN ISOCLS BY',I6,
55 * REDUCE CHANNELS OR MAX CLUSTERS')
56 CALL CMERR
57 10 CONTINUE
58 IRD=TOTPTS/NPTS
59 IF (MOD(TOTPTS,NPTS).EQ.0) GO TO 20
60 IPTS=MOD(TOTPTS,NPTS)
61 IRD=IRD+1
62 IF (IND.EQ.1) NPTS=KPTS
63 GO TO 25
64 20 NPTS=NPTS
65 25 CONTINUE
66
67 CALL ISOCLUST TO PERFORM CLUSTERING
68
69 A1=1
70 A2=AI+MAXCLS*NUFEAT
71 CLDI=AZ+MAXCLS*NUFEAT
72 KPLCE = NPTS*NUFEAT + IDATI
73 CALL ISOCLUST(ARRAY(IDATI),ARRAY(KPLCE),ARRAY(MEANS),ARRAY(NI),
74 * ARRAY(STDEV),KVAR(CLDI),ARRAY(FDI),KVAR(AI),
75 * KVAR(AZ))
76
77 CHAIN CLUSTERS WHOSE DISTANCES ARE LESS THAN DLMIN
78 IF (ICHN.GT.0) CALL CHAIN(KVAR(CLDI))
79
80 PRINT FINAL RESULTS
81 CALL PRINT(-1,ARRAY(KPLCE),ARRAY(MEANS),ARRAY(STDEV),
82 * KVAR(CLDI),ARRAY(FDI),ARRAY(NI))
83
84 CREATE MAP OUTPUT TAPE FOR PMS DAS IF DESIRED
85 IF (MAPFT.GT.0) CALL DSIAPE(ARRAY(KPLCE),KVAR(CLDI),ARRAY(MEANS),
86 * ARRAY(FDI))
87
88 CALCULATE COVARIANCE MATRIX FOR EACH CLUSTER
89 IF (VARSIZ.LNLCAT.GT.KVARDIM) GO TO 30

```

150C0410
150C0420
150C0430

150C0550
150C0560
150C0570
150C0590
150C0600
150C0610

150C0630

APPENDIX B

APPENDIX B

| | | | | | | | | | | | | |
|--------|---------|------|--------|---------|------|--------|--------|------|--------|--------|------|--------|
| 001540 | 279L | 0001 | 001650 | 280L | 0001 | 001604 | 282L | 0001 | 001630 | 283L | 0001 | 001471 |
| 001665 | 245L | 0001 | 000210 | 30L | 0001 | 000232 | 35L | 0001 | 000462 | 355G | 0001 | 000271 |
| 000474 | 364G | 0001 | 000250 | 37L | 0001 | 000507 | 375G | 0001 | 000522 | 40ZG | 0001 | 000301 |
| 000304 | 410F | 0000 | 000306 | 490F | 0000 | 000555 | 5L | 0000 | 000330 | 50L | 0000 | 000317 |
| 000320 | 510F | 0000 | 000322 | 550F | 0000 | 000325 | 630F | 0000 | 000331 | 640F | 0000 | 000267 |
| 000346 | 650F | 0000 | 000364 | 660F | 0000 | 000401 | 670F | 0000 | 000475 | 680F | 0000 | 000501 |
| 000510 | 695F | 0000 | 000353 | 78L | 0000 | 000520 | 700F | 0000 | 000526 | 710F | 0000 | 000531 |
| 000544 | 720F | 0000 | 000556 | 725F | 0000 | 000570 | 730F | 0000 | 000576 | 740F | 0000 | 000576 |
| 000271 | 750F | 0000 | 000277 | 755F | 0001 | 000110 | 765G | 0001 | 000376 | 80L | 0001 | 000461 |
| 000073 | ASAV | 0004 | 000074 | ASAVFL | 0003 | 000115 | BEGIN1 | 0003 | 000116 | BEGIN2 | 0003 | 000412 |
| 000247 | BLANK | 0004 | 000055 | BFILE | 0004 | 000056 | BHKEY | 0000 | 000041 | CAKD | 0000 | 000111 |
| 000000 | CHAR | 0003 | 000016 | CHNTHS | 0000 | 000426 | CHNVC | 0003 | 000120 | CLSNAM | 0000 | 000244 |
| 000254 | COL | 0004 | 000037 | COINVT | 0000 | 000004 | COMVEC | 0000 | 000257 | DASKEY | 0004 | 000025 |
| 000016 | DATE | 0004 | 000071 | DATFIL | 0000 | 000244 | DBCD | 0000 | 000005 | DLMIN | 0004 | 000005 |
| 000066 | DRUMAD | 0000 | 000243 | ERCD | 0000 | 000245 | EQUAL | 0000 | 000003 | FETVEC | 0003 | 000006 |
| 000062 | ERUPTP | 0004 | 000063 | ERPKY | 0000 | 000245 | FACD | 0003 | 000137 | FETVEC | 0006 | 000461 |
| 000000 | FLINUM | 0004 | 000000 | HEAD | 0004 | 000002 | HEDI | 0004 | 000023 | MED2G | 0004 | 000001 |
| 000040 | MISKEY | 0000 | 000251 | ICHT | 0000 | 000235 | IBCD | 0003 | 000114 | IBEGIN | 0003 | 000001 |
| 000015 | ICNIN | 0000 | 000250 | INVEC | 0003 | 000326 | INFILE | 0003 | 000327 | INITM | 0000 | 000441 |
| 000325 | IRUNIT | 0000 | 000006 | ISKEY | 0003 | 000324 | ISKDER | 0000 | 000260 | IPCTP | 0003 | 000121 |
| 000011 | IRU | 0003 | 000273 | ISKEY | 0000 | 000252 | ISTART | 0003 | 000000 | ISTOP | 0000 | 000025 |
| 000012 | NPTS | 0003 | 000003 | KRN | 0000 | 000237 | LHCD | 0003 | 000001 | LSCAT | 0000 | 000005 |
| 000064 | MAP | 0004 | 000100 | MAPFIL | 0003 | 000274 | MAPPHT | 0003 | 000275 | MAPKEY | 0004 | 000005 |
| 000075 | MAPUNT | 0003 | 000136 | MAXCLS | 0000 | 000240 | MBCD | 0003 | 000132 | NCLAS | 0004 | 000012 |
| 000135 | NOFEAT | 0004 | 000065 | NOFILE | 0003 | 000121 | NOFLD | 0003 | 000013 | NOPTS | 0003 | 000046 |
| 000425 | NO5082 | 0007 | 000000 | NUMBER | 0003 | 000133 | NOVRT | 0003 | 000113 | NWDS | 0003 | 000001 |
| 000134 | NXTCLS | 0004 | 000070 | PAGESIZ | 0000 | 000242 | PBCD | 0003 | 000322 | PERCEN | 0003 | 000030 |
| 000014 | PUNCH | 0003 | 000261 | SAVE1 | 0000 | 000262 | SAVE2 | 0004 | 000054 | SAVTAP | 0004 | 000017 |
| 000006 | SEP | 0003 | 000276 | SEQUEN | 0003 | 000323 | STATKY | 0000 | 000137 | SLASH | 0000 | 000014 |
| 000010 | SPTTRIG | 0004 | 000072 | STAFIL | 0003 | 000272 | STATKY | 0003 | 000004 | STDMAX | 0003 | 000001 |
| 000331 | SUBVEC | 0003 | 000175 | SYMMIN | 0003 | 000130 | STFLD | 0003 | 000124 | TOTPTS | 0003 | 000012 |
| 000131 | TOTVRT | 0003 | 000123 | TOTARD | 0003 | 000031 | TRFORM | 0003 | 000236 | UBCD | 0003 | 000012 |
| 000263 | ZERO | 0003 | 000123 | TOTARD | 0003 | 000031 | TRFORM | 0003 | 000236 | UBCD | 0003 | 000012 |

1. SUBROUTINE SETUP7 (ARRAY, TOP, ITIME) SETU0018

2. SETUP7 READS AND ANALYZES ALL CONTROL CARD INPUT FOR THE SETU0020

3. ISOCLS PROCESSOR

4. INCLUDE COMBK5, LIST

5. PARAMETER MAXPOP=60, MXFET=120

6. COMMON/PASS/STOP: ENCAT, ICHN, CHNTHS, CLSNAM, NOFILE, IPT, TOTARD, TOTPTS, ...

7. ... BEGIN2, BEGIN3, CLSNAM, NOFILE, IPT, TOTARD, TOTPTS, ...

8. ... NCLAS, INOCLS, TOTSUB, TOTFLD, TOTVRT, NOCL, NVRT

9. ... VARSIZ, STATKY, ISUKEY, MAPENT, MAPKEY, SEQUEN(20), PERCEN, SIMERP

10. ... IORDER, INUNIT, INFILE, INITH, PHIA, SUBVEC(160), NOSUB2, CHNVC(30)

11. ... NOCHAN, ERCOMP, INOSER

12. ... IMPLICIT INTLGER (A-X)

SETU0040

SETU0070

SETU0080

NEW

NEW


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58* NMIN=30
59* KRM=20
60* NCLASS=1
61* MAXCLS=MAXPOP
62* ICHN=0
63* DO I I=1,MAXPOP
64* SYMIX(I)=SMCLS(I)
65* NOFEAT = 0
66* ISTART = 0
67* CONTINUE
68* IF(IITIME.NE.1)WRITE(6,HEAD)
69* WRITE(6,630)
70* READ(5,480) CODE,CARD
71* WRITE(6,550)CODE,CARD
72* COL=0
73* DO I=1,27
74* IF(CODE.EQ.1)INVC(I) GO TO(20,50,70,80,90,100,110,130,
75* 140,150,280,160,170,250,210,240,200,235,230,220,260,270,246,249
76* 256,263,284),1
77* WRITE(6,490)CODE,CARD
78* GO TO 10
79*
80* CHANNEL CARD
81*
82*
83* 30 J = NITCR(CARD,COL)
84* IF(J.EQ.BLANK) GO TO 10
85* IF(IITIME.NE.1)GO TO 35
86* WRITE(6,640)
87* GO TO 10
88*
89* 35 CONTINUE
90* IF(J.EQ.15)GO TO 37
91* IF(J.EQ.16)GO TO 43
92* WRITE(6,645)
93* FORMAT(' ERROR ON CHANNEL CARD')
94* GO TO 10
95* 37 M = FIND(CARD,COL,EQUEVC)
96* NOCHAN = NUMBER(CARD,COL,CHNVC,NOCHAN)
97* COL = COL - 1
98* CALL ORDER(CHNVC,NOCHAN)
99* GO TO 35
100* 43 M = FIND(CARD,COL,EQUEVC)
101* IF(M.LT.-1) GO TO 36
102* NOFEAT = NUMBER(CARD,COL,FETVEC,NOFEAT)
103* COL = COL - 1
104* CALL ORDER(FETVEC,NOFEAT)
105* GO TO 30
106*
107* C C C
108* C C C
109* 50 J = NITCR(CARD,COL)
110* IF(J.EQ.BLANK) GO TO 10
111* COL=COL-1
112* J = NUMBER(CARD,COL,ISTOP,ISTART)
113* GO TO 10
114*
115* C C C
116* C C C
117* C C C
118* C C C
119* C C C
120* C C C
121* C C C
122* C C C
123* C C C
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NMIN=30
KRN=20
NCLASS=1
MAXCLS=MAXPOP
ICHN=0
DO I I=1,MAXPOP
  SYMIX(I)=SMBS(I)
  NFEAT = 0
  ISTART = 0
  CONTINUE
  IF(I*TIME.NE.1)WRITE(6,HEAD)
  WRITE(6,630)
  READ(5,480) CODE,CARD
  WRITE(6,550)CODE,CARD
  COL=0
  DO 20 I=1,27
    IF(CODE.EQ. INVC(I)) GO TO (30,50,70,80,90,100,110,130,
    .140,150,280,160,170,250,210,240,200,235,230,220,260)270,246,249
    .256,263,284)1
  WRITE(6,490)CODE,CARD
  GO TO 10

CHANNEL CARD
C
C
C
30 J = NXRCHR(CARD,COL)
  IF (J.EQ.BLANK) GO TO 10
  IF(I*TIME.EQ.1)GO TO 35
  WRITE(6,640)
  GO TO 10
35 CONTINUE
  IF(J.EQ.'S')GO TO 37
  IF(J.EQ.'D')GO TO 43
  WRITE(6,645)
  FORMAT(' ERROR ON CHANNEL CARD')
  GO TO 10
36 M = FIND(CARD,COL,EQUEC)
  NOCHAN = NUMBER(CARD,COL,CHNVC,NOCHAN)
  COL = COL - 1
  CALL ORDER(CHNVC,NOCHAN)
  GO TO 35
43 M = FIND(CARD,COL,EQUEC)
  IF (M.LT.-1) GO TO 36
  NFEAT = NUMBER(CARD,COL,FETVEC,NOFEAT)
  COL = COL - 1
  CALL ORDER(FETVEC,NOFEAT)
  GO TO 30

ISTOP CARD (MAXIMUM NUMBER OF ITERATIONS)
C
C
C
50 J = NXRCHR(CARD,COL)
  IF (J.EQ.BLANK) GO TO 10
  COL=COL-1
  J = NUMBER(CARD,COL,ISTOP,ISTART)
  GO TO 10

NMIN_CARD (MINIMUM NUMBER OF POINTS PER CLUSTER)
C
C
C

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SETU0350
SETU0370
SETU0380
NEW
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SETU0420
SETU0430
SETU0440
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SETU0460
SETU0470
SETU0480
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SETU0540
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SETU0560
SETU0570
SETU0580
SETU0590
NEW
NEW
NEW
SETU0620
SETU0720
SETU0730
SETU0740

4/3 40

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|-----|----|--|----------|
| 160 | 70 | J = N1TCHR(CARD,COL) | SETU0750 |
| 170 | | IF (J.EQ.BLANK) GO TO 10 | SETU0760 |
| 118 | | COL = COL-1 | SETU0770 |
| 119 | | J = NUMBER(CARD,COL,NMIN,ISTART) | |
| 120 | | GO TO 10 | |
| 121 | | | |
| 122 | | KRN CARD (NUMBER OF ITERATIONS PER FULL OUTPUT) | SETU0800 |
| 123 | | | SETU0810 |
| 124 | | | SETU0820 |
| 125 | 80 | J = N1TCHR(CARD,COL) | SETU0830 |
| 126 | | IF (J.EQ.BLANK) GO TO 10 | SETU0840 |
| 127 | | COL = COL-1 | SETU0850 |
| 128 | | J = NUMBER(CARD,COL,KRN,ISTART) | SETU0860 |
| 129 | | GO TO 10 | |
| 130 | | | SETU0890 |
| 131 | | STDMAX CARD (MAXIMUM STANDARD DEVIATION PER CLUSTER) | SETU0900 |
| 132 | | J = FLTNUM(CARD,COL,STOMAX,1) | SETU0910 |
| 133 | | GO TO 10 | SETU0920 |
| 134 | | | SETU0930 |
| 135 | | DLNIN CARD (MINIMUM DISTANCE BETWEEN CLUSTER MEANS) | SETU0940 |
| 136 | | J = FLTNUM(CARD,COL,DLNIN,1) | SETU0950 |
| 137 | | GO TO 10 | SETU0960 |
| 138 | | | SETU0970 |
| 139 | | | SETU0980 |
| 140 | | | SETU0990 |
| 141 | | SEP CARD (DISTANCE FOR SPLITTING) | SETU1000 |
| 142 | | J = FLTNUM(CARD,COL,SEP,1) | SETU1010 |
| 143 | | SPK16=1 | SETU1020 |
| 144 | | GO TO 10 | SETU1030 |
| 145 | | | SETU1040 |
| 146 | | MED1 CARD | SETU1050 |
| 147 | | | SETU1150 |
| 148 | | | SETU1160 |
| 149 | | 13U READ (30,500)MED1 | SETU1170 |
| 150 | | GO TO 10 | SETU1180 |
| 151 | | | SETU1190 |
| 152 | | MED2,CARD | SETU1200 |
| 153 | | | SETU1210 |
| 154 | | 14U READ (30,500)MED2 | SETU1220 |
| 155 | | GO TO 10 | SETU1230 |
| 156 | | | SETU1240 |
| 157 | | DATE CARD | SETU1250 |
| 158 | | | SETU1260 |
| 159 | | 15U READ(30,510) DATE | SETU1270 |
| 160 | | GO TO 10 | |
| 161 | | COMMENT CARD | SETU1290 |
| 162 | | | SETU1300 |
| 163 | | | SETU1310 |
| 164 | | 16U READ(30,500)COMENT | SETU1320 |
| 165 | | GO TO 10 | |
| 166 | | SYMBOLS CARD | SETU1340 |
| 167 | | | SETU1350 |
| 168 | | | SETU1360 |
| 169 | | CONTINUE | SETU1370 |
| 170 | | 17U ICNT=ICNT + 1 | |
| 171 | | IF (ICNT.GT.MAXPOP) GO TO 10 | SETU1390 |
| 172 | | SYMTX(ICNT)=BLANK | SETU1400 |
| 173 | | M=MATCH(CARD,COL) | |
| | | IF (M.EQ.BLANK) GO TO 10 | SETU1410 |
| | | | SETU1420 |

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|----|-----|--|----------|
| 16 | 70 | J = NATCHR(CARD,COL) | SETU0750 |
| 17 | | IF (J.EQ.BLANK) GO TO 10 | SETU0760 |
| 18 | | COL = COL-1 | SETU0770 |
| 19 | | J = NUMBER(CARD,COL,NMIN,ISTART) | |
| 20 | | GO TO 10 | |
| 21 | C | KRN CARD (NUMBER OF ITERATIONS PER FULL OUTPUT) | SETU0800 |
| 22 | C | | SETU0810 |
| 23 | C | | SETU0820 |
| 24 | | J = NATCHR(CARD,COL) | SETU0830 |
| 25 | | IF (J.EQ.BLANK) GO TO 10 | SETU0840 |
| 26 | | COL = COL-1 | SETU0850 |
| 27 | | J = NUMBER(CARD,COL,KRN,ISTART) | SETU0860 |
| 28 | | GO TO 10 | |
| 29 | C | STDMAX CARD (MAXIMUM STANDARD DEVIATION PER CLUSTER) | SETU0890 |
| 30 | C | | SETU0900 |
| 31 | C | | SETU0910 |
| 32 | | J = FLTNUM(CARD,COL,STDMAX,1) | SETU0920 |
| 33 | | GO TO 10 | SETU0930 |
| 34 | C | DLNIN CARD (MINIMUM DISTANCE BETWEEN CLUSTER MEANS) | SETU0940 |
| 35 | C | | SETU0950 |
| 36 | C | | SETU0960 |
| 37 | | J = FLTNUM(CARD,COL,DLNIN,1) | SETU0970 |
| 38 | | GO TO 10 | SETU0980 |
| 39 | C | SEP CARD (DISTANCE FOR SPLITTING) | SETU0990 |
| 40 | C | | SETU1000 |
| 41 | C | | SETU1010 |
| 42 | | J = FLTNUM(CARD,COL,SEP,1) | SETU1020 |
| 43 | | SPLITTING | SETU1030 |
| 44 | | GO TO 10 | SETU1040 |
| 45 | C | MEDI CARD | SETU1050 |
| 46 | C | | SETU1060 |
| 47 | C | | SETU1070 |
| 48 | | READ (30,500)MEDI | SETU1080 |
| 49 | | GO TO 10 | SETU1090 |
| 50 | C | MED2,CARD | SETU1200 |
| 51 | C | | SETU1210 |
| 52 | | READ (30,500)MED2 | SETU1220 |
| 53 | | GO TO 10 | SETU1230 |
| 54 | C | DATE CARD | SETU1240 |
| 55 | C | | SETU1250 |
| 56 | C | | SETU1260 |
| 57 | | READ(30,510) DATE | SETU1270 |
| 58 | | GO TO 10 | |
| 59 | C | COMMENT CARD | SETU1290 |
| 60 | C | | SETU1300 |
| 61 | C | | SETU1310 |
| 62 | | READ(30,500)COMMENT | SETU1320 |
| 63 | | GO TO 10 | |
| 64 | C | SYMBOLS CARD | SETU1340 |
| 65 | C | | SETU1350 |
| 66 | C | | SETU1360 |
| 67 | C | | SETU1370 |
| 68 | | CONTINUE | SETU1390 |
| 69 | 100 | ICNT=ICNT+1 | SETU1400 |
| 70 | | IF (ICNT.GT.MAXPOP) GO TO 10 | |
| 71 | | SYMTX(ICNT)=BLANK | |
| 72 | 190 | M=NATCHR(CARD,COL) | SETU1410 |
| 73 | | IF (M.EQ.BLANK) GO TO 10 | SETU1420 |

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174 IF(M.EQ.,.) GO TO 180
175 SYNTAX(ICMT) = M
176 M=NXTRC(CARD,COL)
177 IF(M.EQ.BLANK) GO TO 10
178 IF(M.NE.,.) GO TO 195
179 GO TO 180
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SETU1450

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MAXCLASS CARD (NO. CLASSES FOR THIS EXECUTION OF ISOCLS- STATISTIC
FILE WILL BE WRITTEN AFTER INCLASS' CLASSES HAVE
BEEN CLUSTERED)
IF(ETIME.EQ.1) GO TO 205
WRITE(6,650)
GO TO 10
J=NUMBER(CARD,COL,NCLASS,ISTART)
GO TO 10
MAP CARD (NUMBER OF ITERATIONS TO OUTPUT MAP)
J=NXTRC(CARD,COL)
IF (J.EQ.BLANK) GO TO 10
COL=COL-1
J = NUMBER(CARD,COL,MAP ,ISTART)
GO TO 10
PUNCH CARD (PUNCH STATISTICS ON CARDS)
M = FIND(CARD,COL,CHAR)
IF (M .EQ. 2) PUNCH = 1
IF (M.NE.2) GO TO 245
J = NUMBER(CARD,COL,PUNCH ,ISTART)
GO TO 245
MAP FORMAT CARD
M = NXTRC(CARD,COL)
IF (M .EQ. UBCC) MAPFMT = 1
IF (M .EQ. LBCC) MAPFMT = 2
IF (M .EQ. IH ) MAPFMT = 1
GO TO 10
CLUSTERS CARD (MAX. NO. OF CLUSTERS PER CLASS)
J=NXTRC(CARD,COL)
IF (J.EQ.BLANK) GO TO 10
COL=COL-1
J = NUMBER(CARD,COL,MAXCLS,ISTART)
GO TO 10
CHAIN CARD (CHAIN CLUSTERS WHICH ARE DLIN UNITS APART)
ICHN=1
J=PLTNUM(CARD,COL,CHNTMS,1)
GO TO 10
OPTION CARD
J = NXTRC(CARD,COL)
IF (J .EQ. BLANK) GO TO 10

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SETU1550
SETU1560
SETU1570
SETU1580
SETU1590
SETU1600
SETU1630
SETU1640
SETU1650
SETU1660

SETU1740
SETU1760
SETU1770
SETU1780
SETU1790
SETU1820

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174 IF(M.EQ.0)GO TO 180
175 SYNTAX(ICNT) = M
176 M=NXTCHR(CARD,COL)
177 IF(M.EQ.BLANK)GO TO 10
178 IF(M.NE.0)GO TO 195
179 GO TO 180
180
181 C*
182 C*
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175 SETUI150
MAXCLASS CARD (NO. CLASSES FOR THIS EXECUTION OF ISOCLS- STATISTIC
FILE WILL BE WRITTEN AFTER INCLASSY CLASSES HAVE
BEEN CLUSTERED)
200 IF(IITIME.EQ.1) GO TO 205
WRITE(6,650)
GO TO 10
205 J=NUMBER(CARD,COL,NCLASS,ISTART)
MAP CARD (NUMBER OF ITERATIONS TO OUTPUT MAP)
210 J=NXTCHR(CARD,COL)
IF (J.EQ.BLANK) GO TO 10
COL=COL-1 = NUMBER(CARD,COL,MAP ,ISTART)
GO TO 10
PUNCH CARD (PUNCH STATISTICS ON CARDS)
215 M = FINU(CARD,COL,CHAR)
IF (M .EQ. 2) PUNCH . . .
IF(M.NE.2)GO TO 245
J = NUMBER(CARD,COL,PUNCH ,ISTART)
GO TO 245
MAP FORMAT CARD
220 M = NXTCHR(CARD,COL)
IF (M .EQ. UBCC) MAPFMT = 1
IF (M .EQ. LBCC) MAPFMT = 2
IF (M .EQ. IH ) MAPFMT = 1
GO TO 10
CLUSTERS CARD (MAX. NO. OF CLUSTERS PER CLASS)
230 J=NXTCHR(CARD,COL)
IF (J.EQ.BLANK) GO TO 10
COL=COL-1 = NUMBER(CARD,COL,MAXCLS,ISTART)
GO TO 10
CHAIN CARD (CHAIN CLUSTERS WHICH ARE DELIM UNITS APART)
235 ICHN=1
J=FLTNUM(CARD,COL,CHNTMS,1)
GO TO 10
OPTION CARD
240 J = NXTCHR(CARD,COL)
IF (J .EQ. BLANK) GO TO 10
SETUI1550
SETUI1560
SETUI1570
SETUI1580
SETUI1590
SETUI1600
SETUI1630
SETUI1640
SETUI1650
SETUI1660
SETUI1740
SETUI1760
SETUI1770
SETUI1780
SETUI1790
SETUI1820

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2320 C ORDER COLOR KEYS
2330 C IF(J.EQ.'0')ORDER=1
2340 C
2350 C ERROR COMPUTATION
2360 C
2370 C
2380 C
2390 C IF (J.EQ.'E') GO TO 241
2400 C J=NXTRCH(CARD,COL+1)
2410 C IF (J.EQ.'C') LNCUMP = 1
2420 C
2430 C ERIPS CARD
2440 C IF (J.EQ.'1') ERPKY = 1
2450 C 241 CONTINUE
2460 C
2470 C PUNCH CARD
2480 C
2490 C IF (J.EQ.'BCD') GO TO 215
2500 C
2510 C STATS
2520 C
2530 C IF(J.EQ.'S') GO TO 242
2540 C J=NXTRCH(CARD,COL)
2550 C IF(J.EQ.'T') STATKY=1
2560 C IF(J.EQ.'I') SIMERP=1
2570 C
2580 C DAS CARD
2590 C
2600 C 242 IF(J.EQ.'DBC')DASKEY=1
2610 C
2620 C ERIPS CARD
2630 C
2640 C MEAN VECTOR FOR MPTAP
2650 C IF(J.EQ.'MBCD')MAPKEY=1
2660 C CLUSTERS FOR MPTAP
2670 C IF(J.EQ.'CBCD')MAPNEY=2
2680 C
2690 C FIND A CURMA
2700 C
2710 C 245 J=FINDCARD,COL,COMVEC)
2720 C IF(J.LE.'3160 TO 10
2730 C
2740 C SEQUENCE CARD
2750 C
2760 C
2770 C I=1
2780 C M=NXTRCH(CARD,COL)
2790 C IF (M.EQ.'1') GO TO 248
2800 C SEQUEN(I)=M
2810 C I=I+1
2820 C GO TO 247
2830 C 246 NOSEQ = I - 1
2840 C GO TO 10
2850 C
2860 C PERCENT CARD
2870 C
2880 C 249 J=NXTRCH(CARD,COL)
2890 C IF(J.EQ.'1') GO TO 10

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•NEW

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232 C ORDER COLOR KEYS
233 C IF (J.EQ.0) IORDER=1
234 C
235 C ERROR COMPUTATION
236 C
237 C IF (J.NE.0) GO TO 241
238 C J=NXTRCARD,COL+1
239 C IF (J.EQ.'C') LNCOMP = 1
240 C
241 C ERIPS CARD
242 C IF (J.EQ.'1') ERPKY = 1
243 C
244 C PUNCH CARD
245 C
246 C IF (J.EQ.'PBCD') GO TO 215
247 C
248 C STATS
249 C
250 C IF (J.NE.'S') GO TO 242
251 C J=NXTRCARD,COL
252 C IF (J.EQ.'I') STATKY=1
253 C IF (J.EQ.'1') SIMLRF=1
254 C
255 C DAS CARD
256 C
257 C IF (J.EQ.'D8CUD') DASKEY=1
258 C
259 C ERIPS CARD
260 C
261 C MEAN VECTOR FOR MAPTAP
262 C IF (J.EQ.'NBCD') MAPKEY=1
263 C
264 C CLUSTERS FOR MAPTAP
265 C IF (J.EQ.'CUCD') MAPKEY=2
266 C
267 C FIND A CUMMA
268 C
269 C J=FINDCARD,COL,CONVEC)
270 C IF (J.LE.0) GO TO 10
271 C
272 C SEQUENCE CARD
273 C
274 C I=1
275 C N=NXTRCARD,COL
276 C IF (N.EQ.0) GO TO 248
277 C SEQUEN(I)=M
278 C I=I+1
279 C GO TO 247
280 C NOSEQ = I - 1
281 C GO TO 10
282 C PERCENT CARD
283 C
284 C J=NXTRCARD,COL
285 C IF (J.EQ.'160 TO 10
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3400 COL=CUL-1
3401 J=NUMBER(CARD,COL,IPCT,J)
3402 PERCENT=1.-FLOAT(IPCT/100.)
3403 GO TO 10
3404
3405 C
3406 C
3407 MEANS CARD
3408
3409 J = NIXCHR(CARD,COL)
3410 IF (J.EQ. BLANK) GO TO 10
3411 IF (J.EQ. CBCD) GO TO 255
3412 IF (J.EQ. FBCD) GO TO 10
3413 ISUKEY=1
3414 GO TO 10
3415 ISUKEY=1
3416 CALL RDMEAN(ARRAY)
3417 GO TO 10
3418
3419 C
3420 C
3421 READ MODULE DECK AND WRITE TO INPUT STAT UNIT AND FILE.
3422
3423 SAVEI=SAVTAP
3424 SAVEZ=STAFIL
3425 SAVTAP=INUNIT
3426 STAFIL=INFILE
3427 CALL CRDSTAT(ARRAY, TOP)
3428 SAVTAP=SAVEI
3429 STAFIL=SAVEZ
3430 INITH=1
3431 GO TO 10
3432
3433 C
3434 C
3435 DATA FILE CARD
3436
3437 M = NIXCHR(CARD,COL)
3438 IF (M.EQ. IH) GO TO 10
3439 IF (M.EQ. PU) GO TO 265
3440 IF (M.EQ. F) GO TO 267
3441 WRITE(6,750)
3442 750 FORMAT(' ERROR ON DATA FILE CARD')
3443 GO TO 10
3444
3445 J = FIND(CARD,COL,EQUVEC)
3446 IF (J.EQ. -1) GO TO 263
3447 M = NUMBER(CARD,COL,DATAPE,ZERO)
3448 COL = CUL - 1
3449 GO TO 260
3450
3451 J = FIND(CARD,COL,EQUVEC)
3452 IF (J.EQ. -1) GO TO 263
3453 M = NUMBER(CARD,COL,DATAFIL,ZERO)
3454 DATAFIL = DATAFIL - 1
3455 IF (DATAFIL.LT. 0) DATAFIL = 0
3456 COL = CUL - 1
3457 GO TO 260
3458
3459 C
3460 C
3461 STAT FILE CARD
3462
3463 M=NIXCHR(CARD,COL)
3464 IF (M.EQ. I) GO TO 278
3465 IF (M.EQ. PU) GO TO 275
3466 IF (M.EQ. F) GO TO 277
3467 IF (M.EQ. O) GO TO 272

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290 C   COL=CUL-1
291 C   J=NUMERIC(CARD,COL,IPCT,1)
292 C   PERCE=1.-FLOAT(IPCT/100.)
293 C   GO TO 10
294 C
295 C   MEANS CARD
296 C
297 C   250 J = NATCHR(CARD,COL) GO TO 10
298 C   IF (J .EQ. BLANK) GO TO 265
299 C   IF (J .LG. CBCD) GO TO 265
300 C   IF (J .GE. FBCD) GO TO 10
301 C   ISUKEY=1
302 C   GO TO 10
303 C
304 C   255 ISUKEY=1
305 C   CALL RDMEAN(ARRAY)
306 C   GO TO 10
307 C
308 C   READ MODULE DECK AND WRITE TO INPUT STAT UNIT AND FILE.
309 C
310 C   256 SAVE1=SAVTAP
311 C   SAVE2=STAFIL
312 C   SAVTAP=INUNIT
313 C   STAFIL=INFILE
314 C   CALL CRDSTAT(ARRAY, TOP)
315 C   SAVTAP=SAVE1
316 C   STAFIL=SAVE2
317 C   INITM=1
318 C   GO TO 10
319 C
320 C   DATA FILE CARD
321 C
322 C   260 M = NATCHR(CARD,COL) GO TO 10
323 C   IF (M .EQ. IH) GO TO 10
324 C   IF (M .EQ. IU) GO TO 265
325 C   IF (M .EQ. F) GO TO 267
326 C   263 WRITE(6,750)
327 C   750 FORMAT(' ERROR ON DATA FILE CARD')
328 C   GO TO 10
329 C   265 J = FIND(CARD,COL,EUVECT)
330 C   IF (J.EQ.-1) GO TO 263
331 C   H = NUMERIC(CARD,COL,DATAPE,ZERO)
332 C   COL = CUL - 1
333 C   GO TO 260
334 C   267 J = FIND(CARD,COL,EUVECT)
335 C   IF (J.EQ.-1) GO TO 263
336 C   M = NUMBER(CARD,COL,DATAFIL,ZERO)
337 C   DATAFIL = DATAFIL - 1
338 C   IF (DATAFIL .LT. 0) DATAFIL = 0
339 C   COL = CUL - 1
340 C   GO TO 260
341 C
342 C   STAT FILE CARD
343 C
344 C   270 M=NATCHR(CARD,COL)
345 C   IF (M.EQ.'I') GO TO 275
346 C   IF (M.EQ.'U') GO TO 275
347 C   IF (M.EQ.'F') GO TO 277
348 C   IF (M.EQ.'O') GO TO 272
349 C
350 C   ONEW
351 C   ONEW
352 C   ONEW
353 C   ONEW
354 C   ONEW
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500 C   ONEW

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3480 IF(M.EQ.,.1)GO TO 270
3490 IF(M.EQ.,.1)GO TO 10
3500 WRITE(A,755)
3510 FORMAT(1,ERKX UN STATFILE CARD)
3520 GO TO 10
3530 J=INDIC(CARD,COL,SLASH)
3540 IF(J.EQ.,-1)GO TO 273
3550 INITM=1
3560 M=MATCHK(CARD,COL)
3570 IF(M.EQ.,.1)GO TO 274
3580 IF(M.EQ.,.F)GO TO 277
3590 IF(M.EQ.,.U)GO TO 271
3600 J=INDIC(CARD,COL,EUVEC)
3610 IF(J.EQ.,-1)GO TO 273
3620 M=NUMBER(CARD,COL,SAVTAP,ZERO)
3630 COL=COL-1
3640 GO TO 274
3650 J=INDIC(CARD,COL,EUVEC)
3660 IF(J.EQ.,-1)GO TO 273
3670 M=NUMBER(CARD,COL,STAFIL,ZERO)
3680 COL=COL-1
3690 STAFIL=STAFIL-1
3700 IF(STAFIL.LI.0)STAFIL=0
3710 GO TO 274
3720 J=INDIC(CARD,COL,SLASH)
3730 IF(J.EQ.,-1)GO TO 273
3740 M=MATCHK(CARD,COL)
3750 IF(M.EQ.,.1)GO TO 279
3760 IF(M.EQ.,.F)GO TO 282
3770 IF(M.EQ.,.U)GO TO 271
3780 J=INDIC(CARD,COL,EUVEC)
3790 IF(J.EQ.,-1)GO TO 273
3800 M=NUMBER(CARD,COL,INUNIT,ZERO)
3810 COL=COL-1
3820 GO TO 279
3830 J=INDIC(CARD,COL,EUVEC)
3840 IF(J.EQ.,-1)GO TO 273
3850 M=NUMBER(CARD,COL,INFILE,ZERO)
3860 COL=COL-1
3870 GO TO 279
3880
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3970
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3990
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4010
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C C SUBCLASSES CARD--USE THE MEANS FOR THESE SUBCLASSES FROM THE
C C STAT FILE FOR INITIAL MEANS
C C

283 N0SUB2=NUMBER(CARD,COL,SUBVEC,INDSUB2)
GO TO 10

C C MINIMUM POPULATION FOR STATISTICS PASS.
C C

284 M=NUMBER(CARD,COL,PHIN,ZERO)
GO TO 10

C C *END* CARD

280 CONTINUE
IF (NOFEAT .GT. 0) GO TO 285
NOFEAT=JO
DO 261 I=1,30

| | | |
|------|----------------------------------|-----|
| 3480 | IF(M=EQ.,1160 TO 273) | NEW |
| 3490 | IF(M=EQ.,1160 TO 10 | NEW |
| 3500 | WRITE(6,755) | NEW |
| 3510 | FORMAT(10,ERROR UN STATELE CARD) | NEW |
| 3520 | GO TO 10 | NEW |
| 3530 | J=INDICARD,COL,SLASH) | NEW |
| 3540 | IF(J=EQ.,1160 TO 273 | NEW |
| 3550 | INITIAL | NEW |
| 3560 | M=MATCHCARD,COL) | NEW |
| 3570 | IF(M=EQ.,1160 TO 274 | NEW |
| 3580 | IF(M=EL.,1160 TO 277 | NEW |
| 3590 | IF(M=EL.,1160 TO 271 | NEW |
| 3600 | J=INDICARD,COL,EGUYEC) | NEW |
| 3610 | IF(J=EQ.,1160 TO 273 | NEW |
| 3620 | M=NUMBERCARD,COL,SAVTAP,ZERO) | NEW |
| 3630 | COL=COL-1 | NEW |
| 3640 | GO TO 274 | NEW |
| 3650 | J=INDICARD,COL,EGUYEC) | NEW |
| 3660 | IF(J=EQ.,1160 TO 273 | NEW |
| 3670 | M=NUMBERCARD,COL,STAFIL,ZERO) | NEW |
| 3680 | COL=COL-1 | NEW |
| 3690 | STAFIL=STAFIL-1 | NEW |
| 3700 | IF(STAFIL.LT.0)STAFIL=0 | NEW |
| 3710 | GO TO 274 | NEW |
| 3720 | J=INDICARD,COL,SLASH) | NEW |
| 3730 | IF(J=EQ.,1160 TO 273 | NEW |
| 3740 | M=MATCHCARD,COL) | NEW |
| 3750 | IF(M=EQ.,1160 TO 279 | NEW |
| 3760 | IF(M=EL.,1160 TO 282 | NEW |
| 3770 | IF(M=EL.,1160 TO 271 | NEW |
| 3780 | J=INDICARD,COL,EGUYEC) | NEW |
| 3790 | IF(J=EQ.,1160 TO 273 | NEW |
| 3800 | M=NUMBERCARD,COL,INUNIT,ZERO) | NEW |
| 3810 | COL=COL-1 | NEW |
| 3820 | GO TO 279 | NEW |
| 3830 | J=INDICARD,COL,EGUYEC) | NEW |
| 3840 | IF(J=EQ.,1160 TO 273 | NEW |
| 3850 | M=NUMBERCARD,COL,INFILE,ZERO) | NEW |
| 3860 | COL=COL-1 | NEW |
| 3870 | GO TO 279 | NEW |
| 3880 | | NEW |
| 3890 | | NEW |
| 3900 | | NEW |
| 3910 | | NEW |
| 3920 | | NEW |
| 3930 | | NEW |
| 3940 | | NEW |
| 3950 | | NEW |
| 3960 | | NEW |
| 3970 | | NEW |
| 3980 | | NEW |
| 3990 | | NEW |
| 4000 | END CARD | NEW |
| 4010 | | NEW |
| 4020 | CONTINUE | NEW |
| 4030 | IF (NOFEAT .GT. 0) GO TO 285 | NEW |
| 4040 | NOFEAT=10 | NEW |
| 4050 | DO 201 I=1,30 | NEW |

C C SUBCLASSES CARD--USE THE MEANS FOR THESE SUBCLASSES FROM THE
C C STAT FILE FOR INITIAL MEANS
C C

283 NOSUB2=NUMBER(CARD,COL,SUBYEC,INDSUB2)
GO TO 10

C C MINIMUM POPULATION FOR STATISTICS PASS.
C C

284 M=NUMBER(CARD,COL,PHIN,ZERO)
GO TO 10

C C

280 CONTINUE
IF (NOFEAT .GT. 0) GO TO 285
NOFEAT=10
DO 201 I=1,30

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406 261 FEIVC(1)=1
407 285 CONTINUE
408
409 C
410 C
411 C
412 WRITE(6,660)
413 WRITE(6,670) STOP,MINXRN,NAP,MAXCLS,NCLASS,
414 (FEIVC(1),I,I,NOFEAT)
415 WRITE(6,680) DLMIN,STOMAX
416 IF (SPMIN.EQ.0) WRITE(6,690) SEP
417 IF (SINKR.EQ.1) WRITE(6,695)
418 IF (ICM.NE.1) WRITE(6,700) CHNTHS
419 IF (PUNCH.EQ.1) WRITE(6,710)
420 IF (ORUKR.EQ.1) WRITE(6,715)
421 IF (MAPFMT.EQ.1) WRITE(6,720)
422 IF (MAPKEY.EQ.1) WRITE(6,725)
423 IF (NOFEAT.GT.0) WRITE(6,730)
424 RETURN
425 C
426 FORMAT(A6,4X,62A1)
427 INPUT CARD=IGNORED//15,A6,4X,62A1)
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OF POOR QUALITY

SETU3100

2 OF COMPILATION: NO DIAGNOSTICS.
SYMBOLIC
7 CODE RELOCATABLE

01 FEB 77 05:07:15 0 03360104 12 371
01 FEB 77 05:07:15 0 03375102 14 123

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406 261 FEIVEC(1)=1
407 285 CONTINUE
408 C
409 C
410 C
411 PRINT USER REQUEST
412 WRITE(6,660)
413 WRITE(6,670) STOP, NMIN, NCRN, NAF, MAXCLS, NCLASS,
414 (FEIVEC(1), I, INOFEAT)
415 WRITE(6,680) DLMIN, STDMAX
416 IF (SPMIN(6) .EQ. 1) WRITE(6,690) *EP.
417 IF (SIMLRP(6) .EQ. 1) WRITE(6,695)
418 IF ((PUNCH(6) .EQ. 1) WRITE(6,700) CHNTHS
419 IF (FORUKE(6) .EQ. 1) WRITE(6,705)
420 IF (MAPFT(6) .EQ. 1) WRITE(6,720)
421 IF (MPKEY(6) .EQ. 1) WRITE(6,725)
422 IF (INOFEAT .GT. NMIN) WRITE(6,740)
423 RETURN
424 C
425
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480 FORMAT(16,4X,62A1)
490 FORMAT(' INVALID INPUT CARD--IGNORED',15,A6,1X,62A1)
500 FORMAT(10X,10A6)
510 FORMAT(10X,12A6)
520 FORMAT(15A,16,4X,62A1)
530 FORMAT(// INPUT SUMMARY//)
540 FORMAT(' CHANNELS CANNOT BE CHANGED UNTIL THIS EXECUTION OF ISOCLS IS COMPLETED')
550 FORMAT(' NO. OF CLASSES CANNOT BE CHANGED UNTIL THIS EXECUTION OF ISOCLS IS COMPLETED')
560 FORMAT(// YOU HAVE SELECTED THE FOLLOWING PARAMETER VALUES AND OPTIONS://)
570 FORMAT(' STOP AFTER', I5, ' ITERATION(S) /',
' ALLOW A MINIMUM OF', I5, ' PIXELS PER CLUSTER',
' PRINT A CLUSTER SUMMARY EVERY', I5, ' ITERATION(S) /',
' PRINT A CLUSTER MAP EVERY', I5, ' ITERATION(S) /',
' ALLOW A MAXIMUM OF', I5, ' CLUSTERS PER CLASS',
' THE STATISTICS FILE WILL BE WRITTEN AFTER', I4, ' CLASSES)')
580 HAVE BEEN CLUSTERED',
' CHANNELS ARE', I3, ' 3013 )
590 FORMAT(' DLMIN =', F7.3 / ' STDMAX =', F7.3 )
600 FORMAT(' SEP =', F7.3 )
610 FORMAT(IX, ' SIMULATE ERIP'S CLUSTERING ALGORITHM')
620 FORMAT(' PURCH THE MODULE STAY DECK')
630 FORMAT(' CHAIN CLUSTERS WHICH ARE', F7.3, ' UNITS APART')
640 FORMAT(IX, ' ORDER COLOR KEYS')
650 FORMAT(IX, ' FORM A CLUSTER MAP OUTPUT TAPE IN UNIVERSAL FORMAT')
660 FORMAT(IX, ' WRITE A CLUSTER MAP OUTPUT TAPE IN LARSYS II FORMAT')
670 FORMAT(IX, ' WRITE AN ERIP'S INTERFACE TAPE')
680 *WARNING: NMIN IS LESS THAN NO. OF CHANNELS.COVARIANC
690 *CES WILL NOT BE INVERTIBLE')
700 END

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SETU3100

2 OF COMPILATION: NO DIAGNOSTICS.
7 SYMBOLIC
7 CODE RELOCATABLE

01 FEB 77 05:07:15 0 03360104 17 1971
01 FEB 77 05:07:15 0 03375402 17 122

B-9 46

APPENDIX C

APPENDIX C

GETSTA,GETSTA
JOB FORTRAM V EXEC II LEVEL 25A - (EXEC8 LEVEL EIZDIOCI0A)
OPERATION WAS DONE ON 01 FEB 77 AT 05:08:47

CHNVEC,MEANS,CUVAR,ITRIG)

ROUTINE GETSTA ENTRY POINT C00656

GE USED: CODE(1) 000790; DATA(0) C00276; BLANK_COMMON(2); 000000

NAL REFERENCES (BLOCK, NAME):

- F00SFL
- CMERR
- EXIT
- MEANS
- NOUUS
- NIUUS
- NOUUS
- NIUUS
- START
- MEANS

GE ASSIGNMENT (BLOCK, TYPE, RELATIVE LOCATION, NAME)

| | | | | | | | | | | | |
|--------|--------|------|--------|--------|--------|---------|------|--------|---------|------|--------|
| 000131 | IGOF | 0000 | 000161 | 110F | 000109 | 1346 | 0001 | 000112 | 1456 | 0001 | 000139 |
| 000155 | 1726 | 0000 | 000200 | 200F | 000201 | 2016 | 0000 | 000203 | 210F | 0000 | 000219 |
| 000237 | 2236 | 0001 | 000285 | 230G | 000272 | 2346 | 0000 | 000217 | 235F | 0001 | 000314 |
| 000332 | 25L | 0001 | 000355 | 2636 | 000360 | 2666 | 0001 | 000376 | 2766 | 0001 | 000343 |
| 000415 | 3106 | 0001 | 000424 | 3136 | 000521 | 3406 | 0001 | 000542 | 3466 | 0001 | 000552 |
| 000571 | 3626 | 0001 | 000661 | 5L | 000404 | 50L | 0001 | 000121 | 7L | 0000 | 000142 |
| 000145 | 77L | 0001 | 000162 | 9L | 000074 | BLANK | 0000 | 000000 | CHNVEC | 0000 | 000105 |
| 000036 | WUMVEC | 0000 | 000130 | END | 000104 | | 0000 | 000111 | IC | 0000 | 000123 |
| 000126 | 11 | 0000 | 000223 | INJPS | 000122 | I START | 0000 | 000076 | I STATI | 0000 | 000113 |
| 000115 | JA | 0000 | 000121 | JJ | 000120 | JJJ | 0000 | 000114 | JK | 0000 | 000116 |
| 000117 | L | 0000 | 000124 | LOOPCT | 000125 | LOOPCI | 0000 | 000107 | M8 | 0000 | 000110 |
| 000112 | M | 0000 | 000101 | NCHAN | 000075 | NFTVRT | 0000 | 000077 | NOCLS | 0000 | 000102 |
| 000100 | MOSUB | 0000 | 000127 | START | 000103 | TOIVRT | 0000 | 000106 | VARSIZ | 0000 | 000102 |

10 SUBROUTINE GETSTA UNIT FILE MEANS STDEV NOSUB2 SUBVEC NOCHAN

0000

20 CHNVEC,MEANS,CUVAR,ITRIG)

- 30 C
- 40 C
- 50 C
- 60 C
- 70 C
- 80 C
- 90 C
- 100 C

10 SUBROUTINE GETSTA RETRIEVES THE MEANS AND STANDARD DEVIATIONS FROM A STATISTICS FILE IN THE LANSYS SAVTAPY FORMAT.

INPUT ARGUMENTS:

GETSTA,GETSTA
 108 FORTNAN V EXEC 11 LEVEL 25A - (EXECS LEVEL E12510010A)
 IPILATION WAS DONE ON 01 FEB 77 AT 05:08:47

21 FEB 77

CHNVEC, MEANS, COVAR, ITRIG

ROUTINE GETSTA ENTRY POINT 000656

GE USED: CODE(1) 000740; DATA(0) 000276; BLANK_COMMON(2) 000000

NAL REFERENCES (BLOCK, NAME):

FRASFL
 CRENK
 EXIT
 MREMS
 MROUS
 NI02S
 MROUS
 NI01S
 SART
 MERNJS

GE ASSIGNMENT (BLOCK, TYPE, RELATIVE LOCATION, NAME)

| | | | | | | | | | | | | |
|--------|--------|------|--------|--------|------|--------|--------|------|--------|--------|------|--------|
| 000131 | IGDF | 0000 | 000161 | 110F | 0001 | 000100 | 1346 | 0001 | 000112 | 1456 | 0001 | 000130 |
| 000155 | 1726 | 0000 | 000200 | 200F | 0001 | 000201 | 2016 | 0000 | 000203 | 210F | 0000 | 000213 |
| 000237 | 2236 | 0001 | 000264 | 230G | 0001 | 000272 | 2346 | 0000 | 000217 | 235F | 0001 | 000314 |
| 000332 | 25L | 0001 | 000355 | 263G | 0001 | 000360 | 2666 | 0001 | 000376 | 276G | 0001 | 000343 |
| 000415 | 310G | 0001 | 000424 | 313G | 0001 | 000521 | 3406 | 0001 | 000542 | 3466 | 0001 | 000542 |
| 000571 | 3626 | 0001 | 000461 | 5L | 0001 | 000407 | 50L | 0001 | 000121 | 7L | 0000 | 000172 |
| 000145 | 77L | 0001 | 000162 | 9L | 0000 | R | BLANK | 0000 | 000000 | CHNVEC | 0000 | 000105 |
| 000036 | CHNVEC | 0000 | 000130 | END | 0000 | 000104 | I | 0000 | 000111 | IC | 0000 | 000123 |
| 000126 | 11 | 0000 | 000221 | IN0PS | 0000 | 000120 | I | 0000 | 000076 | ISTAT1 | 0000 | 000113 |
| 000115 | JA | 0000 | 000121 | JJ | 0000 | 000120 | JJJ | 0000 | 000114 | JK | 0000 | 000116 |
| 000117 | L | 0000 | 000124 | LO0PCT | 0000 | 000125 | LO0PCT | 0000 | 000107 | MR | 0000 | 000110 |
| 000112 | M | 0000 | 000101 | NCHAN | 0000 | 000075 | MF | 0000 | 000077 | NOCLS | 0000 | 000102 |
| 000100 | MOSUB | 0000 | 000127 | START | 0000 | 000103 | TOTVRT | 0000 | 000106 | VARSIZ | 0000 | 000102 |

1* SUBROUTINE GETSTA(UNIT, FILE, MEMS, STDEV, MOSUB2, SUBVEC, NOCHAN)

2* CHNVEC, MEANS, COVAR, ITRIG

3*
 4*
 5*
 6*
 7*
 8*
 9*
 10*

FROM A STATISTICS FILE IN THE LANSYS SAVTAP1 FORMAT.

INPUT ARGUMENTS:

NEW
 0001

21 FEB

UNIT - FORTRAN UNIT NUMBER FROM WHICH THE STATS ARE TO BE
 RETRIEVED.
 FILE - FILE NO. ON UNIT FROM WHICH THE STATS ARE TO BE
 RETRIEVED.
 NOCHAN - NO. OF CHANNELS REQUESTED FROM TRAINING SEGMENT,
 NOCHAN LESS THAN OR = NO. OF CHANNELS ON STAT FILE
 CHNVEC - ARRAY CONTAINING ACTUAL CHANNELS REQUESTED FROM
 TRAINING SEGMENT. MUST BE A SUBSET OF CHANNELS
 ON STAT FILE

ITRIG - IF ITRIG=1, ST. DEV. WILL BE RETURNED ALONG WITH MEANS.

OUTPUT ARGUMENTS:

MENS - ARRAY CONTAINING THE MEAN VECTORS FOR EACH SUBCLASS
 (A SUBSET OF THE CHANNELS MAY BE SELECTED, BUT NOT
 A SUBSET OF THE SUBCLASSES).
 STDEV - ARRAY CONTAINING THE SUBSET OF ST. DEV. FOR REQUES-
 TED CHANNELS IN EACH SUBCLASS
 IN EACH SUBCLASS.
 NOSUB - NUMBER OF SUBCLASSES ON THE STAT FILE
 CHNVEC - ARRAY CONTAINING ACTUAL CHANNELS REQUESTED FROM
 TRAINING SEGMENT

NOTE THE STORAGE ARRAYS PASSED TO THIS SUBROUTINE FOR THE
 MEANS AND STANDARD DEVIATIONS SHOULD BE SINGLY DIMENSIONED
 IN THE CALLING ROUTINE. ON OUTPUT THE ITEMS ARE STORED
 AS FOLLOWS: (SAME FOR STDEV)

MEANS (1) - CHANNEL 1, SUBCLASS 1
 (2) - CHANNEL 2, SUBCLASS 1
 (3) - CHANNEL 3, SUBCLASS 1

(NOCHAN)
 (NOCHAN+1) - CHANNEL 1, SUBCLASS 2
 (NOCHAN+2) - CHANNEL 2, SUBCLASS 2
 (NOCHAN+3) - CHANNEL 3, SUBCLASS 2

(2*NOCHAN) - CHANNEL NOCHAN OF SUBCLASS 2

ETC.
 TRU
 (NOCHAN*NOSUB)

DIMENSION CHNVEC(10),DUNVEC(10),CHNVEC(1)
 DATA BLANK /
 DIMENSION SUBVEC(1)
 DIMENSION MEANS(1),STDEV(1)
 IMPLICIT INTEGER(A-Z)

ORIGINAL PAGE IS
 OF POOR QUALITY

UNIT - FORTRAN UNIT NUMBER FROM WHICH THE STATS ARE TO BE
 RETRIEVED.
 FILE - FILE NO. ON UNIT FROM WHICH THE STATS ARE TO BE
 RETRIEVED.
 NOCHAN - NO. OF CHANNELS REQUESTED FROM TRAINING SEGMENT,
 NOCHAN LESS THAN OR = NO. OF CHANNELS ON STAT FILE
 CHNVEC - ARRAY CONTAINING ACTUAL CHANNELS REQUESTED FROM
 TRAINING SEGMENT. MUST BE A SUBSET OF CHANNELS
 ON STAT FILE

ITRIG - IF ITRIG=1, ST. DEV. WILL BE RETURNED ALONG WITH MEANS.

OUTPUT ARGUMENTS:

MENS - ARRAY CONTAINING THE MEAN VECTORS FOR EACH SUBCLASS
 (A SUBSET OF THE CHANNELS MAY BE SELECTED, BUT NOT
 A SUBSET OF THE SUBCLASSES).
 STDEV - ARRAY CONTAINING THE SUBSET OF ST. DEV. FOR REQUES-
 TED CHANNELS IN EACH SUBCLASS
 IN EACH SUBCLASS.
 NOSUB - NUMBER OF SUBCLASSES ON THE STAT FILE
 CHNVEC - ARRAY CONTAINING ACTUAL CHANNELS REQUESTED FROM
 TRAINING SEGMENT

NOTE: THE STORAGE ARRAYS PASSED TO THIS SUBROUTINE FOR THE
 MEANS AND STANDARD DEVIATIONS SHOULD BE SINGLY DIMENSIONED
 IN THE CALLING ROUTINE. ON OUTPUT THE ITEMS ARE STORED
 AS FOLLOWS: (SAME FOR STDEV)

```

MEANS(I) - CHANNEL 1; SUBCLASS 1
(2) - CHANNEL 2; SUBCLASS 1
3 - CHANNEL 3; SUBCLASS 1
.
.
.
(NOCHAN) - NOCHAN; SUBCLASS 1
(NOCHAN+1) - CHANNEL 1; SUBCLASS 2
(NOCHAN+2) - CHANNEL 2; SUBCLASS 2
(NOCHAN+3) - CHANNEL 3; SUBCLASS 2
.
.
.
(2*NOCHAN) - CHANNEL NOCHAN OF SUBCLASS 2

```

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ETC.
 (NOCHAN*NOCLAS)

DIMENSION CHNVEC(1:3), DUHVEC(1:3), CHNVEC(I)
 DATA BLANK / /
 DIMENSION SUBVEC(1)
 DIMENSION MEANS(1), STDEV(1)
 IMPLICIT INTEGER(A-Z)


```

1270 25 CONTINUE
1280 IC = IC + 1
1290 HB = MB + NCHAN
1300 HC = ME + NCHAN
1310
1320 30 CONTINUE
1330
1340 C GET SUBSET OF MEANS
1350 C AND GET SUBSET OF ST. DEV.
1360 C
1370 J=1,NOCHAN
1380 K=1,NCHAN
1390 IF (CHNVEC(J).EQ. CHNVEC(K)) GO TO 50
1400 WRITE(6,10)CHNVEC(J),CHNVEC(K),I,NCHAN
1410 FORMAT(' CHANNEL NO. ',I2,' IS NOT ON TRAINING STAT FILE. CHANNELS
1420 ARE // 10X,30(12,1X)')
1430 CALL EXIT
1440 DUHVEC(J) = K
1450
1460 C
1470 JJJ = 0
1480 K=1,NOSUBZ
1490 J=1,NOCHAN
1500 JJ = DUHVEC(J) + (K-1)*NCHAN
1510 MEANS(JJJ) = MEANS(JJ)
1520 IF (ITRIG.NE. 0) STDEV(JJJ) = STDEV(JJ)
1530
1540 200 FORMAT(/,157,'MEANS')
1550 WRITE(6,200)
1560 ISTART = 1
1570 IEND = 12
1580 LOUPCT = NOCHAN/12
1590 LOUPCI = MOD(NOCHAN,12)
1600 IF (LOUPCI .GT. 0) LOUPCT = LOUPCT + 1
1610 IF (LOUPCT .EQ. 1) IEND = NOCHAN
1620 DO 240 I=1,LOUPCT
1630 START = ISTART
1640 END = IEND
1650 WRITE(6,210) (BLANK, CHNVEC(I), I=ISTART, IEND)
1660 FORMAT(/,2A,'CLUSTER',5X,12(1A),CH(9,12,9)'.2X)')
1670 DO 230 J=1,NOSUBZ
1680 WRITE(6,220)SUHVEC(J), (MEANS(K), K=START, END)
1690 FORMAT(5X,12,7X,12(17,2,1X)')
1700 START = ISTART + NOCHAN*J
1710 END = IEND + NOCHAN*J
1720 CONTINUE
1730 WRITE(6,235)
1740 FORMAT(/)
1750 ISTART = IEND + 1
1760 IEND = IEND + 1
1770 IF (IEND .GT. NOCHAN) IEND = NOCHAN
1780 CONTINUE
1790 RETURN
1800 END

```

NO OF COMPILATION: 01 FEB 77 05:07:14 0 8347253 19 170 18
 SYMBOLIC 01 FEB 77 05:07:14 0 8347253 19 170 18
 RELOCATABLE 01 FEB 77 05:07:14 0 8347253 19 170 18

2451

```

127* 25 CONTINUE
128* IC = IC + I
129* MB = MB + NCRAN
130* MC = ME + NCHAN
131*
132* 30 CONTINUE
133*
134* C GET SUBSET OF MEANS
135* C AND GET SUBSET OF ST. DEV.
136* C
137* DO 50 J=1,NOCHAN
138* DO 40 K=1,NCHAN
139* IF (CHNVEC(J) .EQ. CHNVEC(K)) GO TO 50
140* WRITE(6,10)CHNVEC(J),CHNVEC(K),I,J,NCHAN
141* 110 FORMAT(' CHANNEL NO. ',I2,' IS NOT ON TRAINING STAT FILE. CHANNELS
142* ARE ',10X,30(12,1X))
143* CALL EXIT
144* 50 DUMVEC(J) = K
145* C
146* JJJ = 0
147* DO 60 K=1,NOSUBZ
148* JJ = DUMVEC(J) + (K-I)*NCHAN
149* MEANS(JJJ) = MEANS(JJJ)
150* IF (ITRIG .NE. 0) STDEV(JJJ) = STDEV(JJJ)
151* 60 WRITE(6,200)
152* 200 FORMAT('157',MEANS)
153* ISTART = I
154* IEND = I2
155* LOOPCT = NOCHAN/I2
156* LOOPCI = MOD(NOCHAN,I2)
157* IF (LOOPCI .GT. 0) LOOPCT = LOOPCT + 1
158* IF (LOOPCT .EQ. 1) IEND = NOCHAN
159* DO 240 I=1,LOOPCT
160* START = ISTART
161* IEND = IEND
162* WRITE(6,210) (BLANK, CHNVEC(I), I=ISTART, IEND)
163* 210 FORMAT(/,21X) (CLUSTER, 5X, I2, 1X) (CH(I, I2, 7), 2X))
164* DO 230 J=1, NOSUBZ
165* WRITE(6,220) (DUMVEC(J), (MEANS(K), K=START, END)
166* 220 FORMAT(5X, I2, 7X, I2(1F7.2), 2X))
167* START = ISTART + NOCHAN/J
168* IEND = IEND + NOCHAN/J
169* END = IEND + NOCHAN/J
170* CONTINUE
171* WRITE(6,235)
172* 235 FORMAT(/)
173* ISTART = IEND + I
174* IEND = IEND + I
175* IF (IEND .GT. NOCHAN) IEND = NOCHAN
176* 240 CONTINUE
177* RETURN
178* END

```

```

NO OF COMPILATION: NO DIAGNOSTICS.
:TA CODE RELOCATABLE
01 FEB 77 05:07:14 0 83742327 13 178 18
01 FEB 77 05:07:14 0 83742653 14 178 18

```

24 51

APPENDIX D

APPENDIX D

ESCM,DESCEN
1108 FORTMAN V EXEC II LEVEL 25A (EXEC3 LEVEL E12010010A)
MPILATION HAS DUNE ON 01 FEB 77 AT 05:07:34

01 FEB 77

ROUTINE DESCEN ENTRY POINT U00153

16E USED: CUDE(1) 000174; DATA(0) 000271; BLANKS COMMON:21 000000

FINAL REFERENCES (BLOCK, NAME)

1 NERR35

GE ASSIGNMENT (BLOCK, TYPE, RELATIVE LOCATION, NAME)

000012 60L 0001 000037 70L 0001 000072 75L 0001 000073 80L 0001 000134
000005 INJPS 0000 1 00001 J 0000 1 00004 K 0000 R 000000 SAVE 0000 1 000002
1 000003 SAVE2

```
10 SUBROUTINE DESCEN(SCN,LNCAT,PTRI,PTR2)
20 IMPLICIT INTEGER(A-X)
30 DIMENSION PTRI(LNCAT),PTR2(LNCAT)
40 REAL SCN(LNCAT),SAVE
50 J=0
60 J=J+1
70 IF(J.GT.LNCAT)GO TO 70
80 IF(J.EQ.LNCAT)GO TO 75
90 IF(SCN(J).LT.SCN(J+1))GO TO 70
100 GO TO 60
110 C 70
120 SAVE=SCN(J)
130 SCN(J)=SCN(J+1)
140 SCN(J+1)=SAVE
150 C
160 SAVE1=PTRI(J)
170 PTRI(J)=PTRI(J+1)
180 PTRI(J+1)=SAVE1
190 C
200 SAVE2=PTR2(J)
210 PTR2(J)=PTR2(J+1)
220 PTR2(J+1)=SAVE2
230 K=J
240 K=J
250 IF(K.EQ.1)GO TO 60
260 IF(SCN(K).LT.SCN(K-1))GO TO 60
270 C
280 SAVE=SCN(K-1)
290 SCN(K-1)=SCN(K)
300 SCN(K)=SAVE
310 C
320 SAVE1=PTRI(K-1)
330 PTRI(K-1)=PTRI(K)
340 PTRI(K)=SAVE1
```

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EXECUTIVE EXECUTIVE LEVEL 25A - (EXECUTIVE LEVEL EXECUTIVE)
COMPILATION WAS DONE ON 01 FEB 77 AT 05:07:34

01 FEB 77

ROUTINE DESCEN ENTRY POINT U00153

PAGE USED: CUDE(1) 000174; DATA(0) 000027; BLANK COMMON(2) 000000

FINAL REFERENCES (BLOCK, NAME)

1 NERR35

GE ASSIGNMENT (BLOCK, TYPE, RELATIVE LOCATION, NAME)

000012 60L 0001 000037 70L 0001 000072 75L 0001 000075 80L 0001 000138
000005 INJPS 0000 1 000001 J 0000 1 000004 K 0000 R 000000 SAVE 0000 1 000002
1 000003 SAVE2

10 SUBROUTINE DESCEN(SCN,LNCAT,PTR1,PTR2)
20 IMPLICIT INTEGER(A-X)
30 DIMENSION PTR1(LNCAT),PTR2(LNCAT)
40 REAL SCN(LNCAT),SAVE
50 J=0

60 J=J+1
70 IF(J.GT.LNCAT)GO TO 90
80 IF(J.EQ.LNCAT)GO TO 75
90 IF(SCN(J).LT.SCN(J+1))GO TO 70
100 GO TO 60

110 C 70 SAVE=SCN(J)
120 SCN(J)=SCN(J+1)
130 SCN(J+1)=SAVE

140 C SAVE1=PTR1(J)
150 PTR1(J)=PTR1(J+1)
160 PTR1(J+1)=SAVE1

170 C SAVE2=PTR2(J)
180 PTR2(J)=PTR2(J+1)
190 PTR2(J+1)=SAVE2

200 K=J
210 IF(K.EQ.1)GO TO 60
220 IF(SCN(K).LT.SCN(K-1))GO TO 60

230 C 75 SAVE=SCN(K-1)
240 SCN(K-1)=SCN(K)
250 SCN(K)=SAVE

260 C 80 SAVE1=PTR1(K-1)
270 PTR1(K-1)=PTR1(K)
280 PTR1(K)=SAVE1

ORIGINAL PAGE IS
OF POOR QUALITY

34
35
36
37
38
39
40
41
42

C

```
SAVE2=PTR2(K-1)  
PTR2(K-1)=PTR2(K)  
PTR2(K)=SAVE2  
K=K-1  
GO TO 80  
CONTINUE  
RETURN  
END
```

90

NO OF COMPILATION: NO DIAGNOSTICS.

D-2 54

34*
35*
36*
37*
38*
39*
40*
41*
42*

C

SAVE2=PTR2(K-1)
PTR2(K-1)=PTR2(K)
PTR2(K)=SAVE2
K=K-1
GO TO 80
CONTINUE
RETURN
END

90

NO OF COMPIATION: NO DIAGNOSTICS.

D-2 54

APPENDIX E

APPENDIX E

PL:1,PSPLIT
108 FORTRAN V EXEC II LEVEL 25A - (EAC9 LEVEL E:201010A)
PILATION WAS DONE ON 01 FEB 77 AT 05:07:36

UTINE PSPLIT ENTRY POINT 000450

GE USED: CODE(1) 000500: DATA(0) 00077: BLANK COMMON(2) 000000

ON BLOCKS:
PASS 000467

NAL REFERENCES (BLOCK, NAME)

RREAD
RWRITE
CLOCK
MPOS
MPOS
SWRT
MERR3S

GE ASSIGNMENT (BLOCK, TYPE, RELATIVE LOCATION, NAME)

| | | | | | | | | | | | |
|--------|--------|--------|--------|-------|--------|------|--------|--------|------|--------|-----|
| 000303 | IC5L | 000307 | 110L | 00056 | 1166 | 0001 | 00060 | 1226 | 0001 | 00079 | 14C |
| 000200 | 1656 | 000204 | 1714 | 00076 | 20L | 0001 | 000253 | 2106 | 0001 | 000357 | 23J |
| 000363 | 2376 | 000414 | 2476 | 00073 | 25L | 0001 | 000415 | 2526 | 0000 | 000016 | 30F |
| 000143 | 4UL | 000220 | 70L | 00005 | ADRES1 | 0001 | 000006 | ADRES2 | 0003 | 000115 | BEG |
| 000116 | BEGIN2 | 000117 | BEGIN3 | 00016 | CHMTHS | 0003 | 000426 | CMHVC | 0003 | 000120 | CLS |
| 000091 | VIST | 000005 | DLMIN | 00046 | CMCOMP | 0003 | 000137 | FETVEC | 0000 | 000003 | I |
| 000114 | IBEGIN | 000007 | ICCT | 00017 | ICHAIN | 0003 | 000015 | ICMNR | 0003 | 000326 | INF |
| 000327 | INITM | 000030 | INJPS | 00025 | INUNIT | 0003 | 000324 | ICMNR | 0003 | 000122 | IPR |
| 000010 | IRC | 000011 | IRD | 00027 | ISUKEY | 0000 | 000012 | ISTAT | 0000 | 000011 | IPR |
| 000004 | J | 000014 | K | 00013 | KK | 0003 | 000012 | KPIS | 0003 | 000003 | KRM |
| 000001 | LNCAT | 000007 | MAP | 00027 | MAPPMT | 0003 | 000275 | MAPKEY | 0003 | 000136 | MAX |
| 000125 | MCLASS | 000002 | MMIN | 00044 | NOCHAN | 0003 | 000132 | NOCLL | 0003 | 000126 | MOL |
| 000135 | NOFEAT | 000121 | NOFLD | 00013 | NOPTS | 0003 | 000466 | NOSEW | 0003 | 000425 | MOS |
| 000133 | NOVRT | 000113 | NOVS | 00013 | NOVCLS | 0003 | 000322 | PERCEN | 0003 | 000330 | PHI |
| 000014 | PUNCH | 000002 | RND | 00000 | SDIST | 0003 | 000006 | SEP | 0003 | 000276 | SEQ |
| 000323 | SINERP | 000010 | SPTRIG | 00027 | STAKY | 0003 | 000004 | STDMAX | 0003 | 000000 | STO |
| 000311 | SUBVEC | 000175 | SYMTX | 00015 | TIME | 0003 | 000130 | TOTFLD | 0003 | 000124 | TOT |
| 000127 | TOTSUB | 000131 | TOTVRT | 00013 | TOTWRD | 0003 | 000271 | VARSIZ | 0003 | | |

10 C SUBROUTINE PSPLIT(MEANS,STDEV,N,CLD,C,IPLACE,AVP,ARM,MEN)
 20 C
 30 C
 40 INCLUDE COMBKS,LIST
 40 PARAMETER MAXPOP=60,MXFETI=30
 40 COMMON/PASS/STOP,LNCAT,MMIN,KRM,STDMAX,DLMIN,SEP,
 40 MAP,SPTRIG,IRD,KPIS,NOPTS,PUNCH,
 40 ICHN,CHMTHS,ICHAIN(MAXPOP),ARDS,IBEGIN,BEGIN1,

PL11PSPPLIT
100 FORTRAN V EXEC 11 LEVEL 25A - (EXEC9 LEVEL E:2010010A)
PILATION WAS DONE ON 01 FEB 77 AT 05:07:36

UTINE PSPPLIT ENTRY POINT 000450

GE USED: CODE(1) 000500; DATA(0) 000077; BLANK COMMON(2) 000000

ON BLOCKS:
PASS 000467

NAL REFERENCES (BLOCK, NAME)

RREAD
RWRITE
CLOCK
MPOS
MPOS
MPOS
SWRT
MERR3S

| GE | ASSIGNMENT | BLOCK | TYPE | RELATIVE LOCATION, NAME |
|--------|------------|--------|--------|-------------------------|
| 000303 | 165L | 000307 | 110L | 000056 116G |
| 000200 | 165G | 000203 | 171L | 000076 20L |
| 000363 | 237G | 000414 | 247G | 000123 25L |
| 000143 | 4UL | 000220 | 70L | 000005 ADRESI |
| 000116 | BEGIN2 | 000117 | BEGIN3 | 000016 CRNTHS |
| 000001 | DIST | 000005 | DELIN | 000415 ERCOMP |
| 000114 | 1BEGIN | 000017 | 1CHAIN | 000017 1CHAIN |
| 000327 | INTM | 000325 | INUMIT | 000325 INUMIT |
| 000010 | INC | 000273 | ISUKEY | 000273 ISUKEY |
| 000004 | J | 000013 | KK | 000013 KK |
| 000001 | LNCAT | 000274 | KAPFMT | 000274 KAPFMT |
| 000125 | MCLASS | 000464 | NOCHAN | 000464 NOCHAN |
| 000135 | NOFEAT | 000013 | NOPIS | 000013 NOPIS |
| 000133 | RVKT | 000134 | MXICLS | 000134 MXICLS |
| 000014 | PUNCH | 000302 | RNV | 000302 RNV |
| 000323 | SUBVCP | 000015 | SPTRIG | 000015 SPTRIG |
| 000311 | SUBVEC | 000175 | SYMTEX | 000175 SYMTEX |
| 000127 | TOTSUB | 000131 | TOTVRT | 000131 TOTVRT |
| 000253 | | 000253 | | 000253 |
| 000415 | | 000415 | | 000415 |
| 000006 | | 000006 | | 000006 |
| 000137 | | 000137 | | 000137 |
| 000015 | | 000015 | | 000015 |
| 000324 | | 000324 | | 000324 |
| 000012 | | 000012 | | 000012 |
| 000275 | | 000275 | | 000275 |
| 000132 | | 000132 | | 000132 |
| 000466 | | 000466 | | 000466 |
| 000322 | | 000322 | | 000322 |
| 000006 | | 000006 | | 000006 |
| 000004 | | 000004 | | 000004 |
| 000130 | | 000130 | | 000130 |
| 000271 | | 000271 | | 000271 |
| 1226 | | 1226 | | 1226 |
| 210G | | 210G | | 210G |
| 252G | | 252G | | 252G |
| ADRESI | | ADRESI | | ADRESI |
| CRNTHS | | CRNTHS | | CRNTHS |
| ERCOMP | | ERCOMP | | ERCOMP |
| 1CHAIN | | 1CHAIN | | 1CHAIN |
| INUMIT | | INUMIT | | INUMIT |
| ISUKEY | | ISUKEY | | ISUKEY |
| KK | | KK | | KK |
| KAPFMT | | KAPFMT | | KAPFMT |
| NOCHAN | | NOCHAN | | NOCHAN |
| NOPIS | | NOPIS | | NOPIS |
| MXICLS | | MXICLS | | MXICLS |
| RNV | | RNV | | RNV |
| SPTRIG | | SPTRIG | | SPTRIG |
| SYMTEX | | SYMTEX | | SYMTEX |
| TOTVRT | | TOTVRT | | TOTVRT |
| 000179 | | 000179 | | 000179 |
| 000357 | | 000357 | | 000357 |
| 000016 | | 000016 | | 000016 |
| 000115 | | 000115 | | 000115 |
| 000120 | | 000120 | | 000120 |
| 000003 | | 000003 | | 000003 |
| 000322 | | 000322 | | 000322 |
| 000011 | | 000011 | | 000011 |
| 000003 | | 000003 | | 000003 |
| 000003 | | 000003 | | 000003 |
| 000136 | | 000136 | | 000136 |
| 000126 | | 000126 | | 000126 |
| 000425 | | 000425 | | 000425 |
| 000330 | | 000330 | | 000330 |
| 000276 | | 000276 | | 000276 |
| 000000 | | 000000 | | 000000 |
| 000124 | | 000124 | | 000124 |
| 143 | | 143 | | 143 |
| 23F | | 23F | | 23F |
| 30F | | 30F | | 30F |
| BEG | | BEG | | BEG |
| CLS | | CLS | | CLS |
| INT | | INT | | INT |
| IPR | | IPR | | IPR |
| KRM | | KRM | | KRM |
| MAX | | MAX | | MAX |
| NOS | | NOS | | NOS |
| PHI | | PHI | | PHI |
| SEP | | SEP | | SEP |
| STO | | STO | | STO |
| TOI | | TOI | | TOI |

10 C SUBROUTINE PSPPLIT(MEANS,STDEY,N,CLO,C,I,PLACE,AVP,AMN,MEN)
 20 C
 30 C
 40 INCLUDE COMBNS,LIST
 40 PARAMETER MAXPOP=60,MXFETI=30
 40 COMMON/PASS/STOP,LNCAT,MMIN,KRN;SIDMAX,DLMIN,SEP,
 40 MAP,SPTRIG,IRD,KPTS,NOPIS,PUNCH,
 40 ICHN,CHNTHS,1CHAIN(MAXPOP),AWDS,IBEGIN,BEGIN1,
 40


```

40  •   BLGIN2,BEGIN3,CLSRAN,NOFLD,IPT, TOTRD,TOTPTS,
41  •   NCLASS,NOCLS,TOTSUB,TOTELD,TOTVRT,NOCL,NVRT
42  •   ,NXTCLS,NOFEAT,MAXCLS,FETVEC(30),SYMTX(60)
43  •   ,VARSIZ,STAKY,ISUKEY,MAPFMT,MAPKEY,SEQUEN(20),PERCEN,SIMERP
44  •   ,JURDER,IHUIFI,INFILE,INITM,PRIN,SUBVEC(60),NOSUBZ,CHNVC(30)
45  •   ,NUCHAN,ERCUMP,NOSEQ
46  •   IMPLICIT INTEGER (A-X)
47  •   END
48  •
49  •   DIMENSION C(NOFEAT,NOPTS), IPLACE(NOPTS), AMN(NOFEAT,MAXCLS)
50  •   DIMENSION STUEY(NOFEAT,MAXCLS), OLD(MAXCLS,MAXCLS), N(MAXCLS)
51  •   DIMENSION AVP(NOFEAT,MAXCLS), MEANS(30,60)
52  •   REAL MEN(NOFEAT,LNCAT)
53  •   REAL AMN,STDEV,AVP,SDIST,DIST,C,RND,MEANS
54  •
55  •   DO 5 I=1,LNCAT
56  •     N(I)=0
57  •     DO 5 J=1,NOFEAT
58  •       AMN(J,I)=0.0
59  •       STDEV(J,I)=0.0
60  •       AVP(J,I)=0.0
61  •     END DO
62  •
63  •   ASSIGN DATA TO CLUSTERS
64  •
65  •   ADRES1=BEGIN1
66  •   ADRES2=BEGIN2
67  •   ICCT=NOPTS
68  •   IRC=IRD
69  •   IF(IRC.LE.1) ICCT=KPTS
70  •   IF(IRD.EQ.0) GO TO 40
71  •   IWRDS=NOFEAT*ICCT
72  •   CALL RREAD(ADRES1,C,IWRDS,ISTAT)
73  •   ADRES1=ADRES1+IWRDS
74  •   IF(ISTAT.EQ.1) GO TO 25
75  •   IF(ISTAT.EQ.0) GO TO 40
76  •   IF(ISTAT.GE.0) GO TO 40
77  •   WRITE(6,JU)ISTAT
78  •   FORMAT(' ERROR READING DRUM---ISTAT=',I5)
79  •   CONTINUE
80  •   DO 100 I=1,ICCT
81  •     KK=1
82  •     SDIST=10.0E+20
83  •     DO 70 J=1,LNCAT
84  •       DIST=0.0
85  •       DO 50 K=1,NOFEAT
86  •         DIST=DIST+ABS(PLANS(K,J)-C(K,I))
87  •         IF(DIST-SDIST)60,70,70
88  •       KK=J
89  •     SDIST=DIST
90  •     CONTINUE
91  •     R(KK)=N(KK)+1
92  •     IPLACE(I)=KK
93  •     DO 90 K=1,NOFEAT
94  •       AMN(K,KK)=AMN(K,KK)+C(K,I)
95  •       AVP(K,KK)=AVP(K,KK)+C(K,I)*C(K,I)
96  •     CONTINUE
97  •     IF(IRD.EQ.0) GO TO 110

```

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```

550 CALL RWRITE(ADRES2,IPLACE,ICCI,IJSTAT)
560 ADRES2=ADRES2+10CT
570 IF(IJSTAT.EQ.1)GO TO 105
580 IRC=INC-1
590 IF(IRC.GT.0)GO TO 20
600 CALL CLOCK(TIME)
610 DO 130 K=1,LMCAT
620 RND=FLOAT(IN(K))
630 DO 130 J=1,NOFLAT
640 AMN(J,K)=AMN(J,K)/RND
650 MEANS(J,K)=AMN(J,K)
660 STDEV(J,K)=SQRT(AYP(J,K)/RND-AMN(J,K))
670
680 DO 140 I=1,LMCAT
690 DO 140 J=1,NOFLAT
700 MEN(J,I) = MEANS(J,I)
710
720 RETURN
730
740

```

NO OF COMPILATION: NO DIAGNOSTICS.

```

55* CALL WRITE(ADRES2,IPLACE,ICCI,ISTAT)
56* ADRES2=ADRES2+ICCI
57* IF(ISTAT.EQ.1)GO TO 105
58* IRC=IRC-1
59* IF(IRC.GT.0)GO TO 20
60* CALL CLOCK(TIME)
61* DO 130 K=1,LNCAT
62* RND=FLOAT(IN(K))
63* DO 130 J=1,NOFEAT
64* AMN(J,K)=AMN(J,K)/RND
65* MEANS(J,K)=AMN(J,K)
66* STDEV(J,K)=SQRT(AVP(J,K)/RND-AMN(J,K)**2)
67*
68*
69* DO 140 I=1,LNCAT
70* DO 140 J=1,NOFEAT
71* MEANS(J,I) = MEANS(J,I)
72*
73* RETURN
74*
C
C
C

```

NO OF COMPILATION: NO DIAGNOSTICS.

APPENDIX F

APPENDIX F

```

000467 2776 001174 280L 0000 003752 30F 0001 001215 310L 000523
000526 3156 001221 320L 0000 004052 340F 0001 001253 350L 000634
000670 349F 000204 40L 0001 001337 400L 0001 000723 403C 0001 001343
001477 425L 001501 430L 0001 000775 433C 0001 001601 435L 0001 001617
001506 4416 001036 4466 0001 001917 480L 0000 004105 490F 0001 001617
004040 503F 000403 503F 0001 001713 530L 0000 004122 540F 0001 001307
001730 550L 000140 5246 0001 001347 570L 0001 001361 602C 0001 001307
001421 6106 001450 6276 0001 001551 6516 0001 001576 6616 0001 000267
001636 7036 001651 7116 0001 002133 7576 0001 002134 7576 0001 000271
003715 ADRES1 0000 000073 ASAV 0004 000074 ASAVFL 0003 000115
000116 BEGIMZ 0003 000055 BMFILE 0004 000056 BMKEY 0003 000016
000426 CHNVC 0003 000059 DATAPE 0004 000071 DATFIL 0000 000067
000102 DIJ 0000 000055 DLMIN 0000 000100 DMIN 0004 000067
000066 DRUMAD 0003 000062 ERIPYP 0004 000063 EKPKEY 0000 000104
000103 ESUM 0003 000060 HEAD 0004 000057 MISFIL 0004 000060
003711 000114 000114 000114 000114 000114 000114 000114 000114 000114
003737 000114 000114 000114 000114 000114 000114 000114 000114 000114
004165 000114 000114 000114 000114 000114 000114 000114 000114 000114
003720 000114 000114 000114 000114 000114 000114 000114 000114 000114
003724 000114 000114 000114 000114 000114 000114 000114 000114 000114
003740 000114 000114 000114 000114 000114 000114 000114 000114 000114
003713 000114 000114 000114 000114 000114 000114 000114 000114 000114
000275 000114 000114 000114 000114 000114 000114 000114 000114 000114
000466 000114 000114 000114 000114 000114 000114 000114 000114 000114
000374 000114 000114 000114 000114 000114 000114 000114 000114 000114
000070 000114 000114 000114 000114 000114 000114 000114 000114 000114
000076 000114 000114 000114 000114 000114 000114 000114 000114 000114
000006 000114 000114 000114 000114 000114 000114 000114 000114 000114
000000 000114 000114 000114 000114 000114 000114 000114 000114 000114
000130 000114 000114 000114 000114 000114 000114 000114 000114 000114
000061 000114 000114 000114 000114 000114 000114 000114 000114 000114

```

SUBROUTINE ISODATIC(PLACE,MEANS,N,STDEV,CLD,FLDINF,AVP,AMM)

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60
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90
000

INCLUDE COMBK5,LIST
PARAMETER MAXPOP=40,MAFET=30
COMMON/PASS/SIOP/LNCAT,MINMIN,MIN,STDMAX,DLMIN,SEP,
MAP,SPTRIG,IND7,KPTS,NOPTS,PUNCH,
ICHR,CHINTS,ICHAIR(MAXPOP),MDS,IBEGIN,BEGINI,
BEGINZ,BEGIN3,CLSNUM,NOFD,IPT,TOTARD,TUTPTS,
NCLASS,NOCLS,TOTSUB,TOTFLD,TOTVRT,NOCL,NVRT
*VARSIZ,STATY,ISOKEY,MAPKEY,SEVEN(20),SYMTR(60)
*IORDER,IAUDII,INFILE,MINMIN,SUBVEC(160),PCCEM,SIEMRP
*IMPLICIT INTEGER (A-X)
END

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000467 2776 001174 280L 0000 003742 30F 0001 001215 310L 000523
000526 3156 001221 320L 0000 004052 340F 0001 001253 350L 000634
001470 390F 000204 40L 0001 001337 400L 0001 000723 403G 0001 001343
001477 425L 0001501 430L 0001 000775 433G 0001 001601 435L 0001 001615
001006 4416 0001036 4466 0001 001517 480L 0000 004105 490F 0001 001617
004040 502F 0004037 503F 0001 001347 530L 0000 001347 602G 0001 001307
001730 550L 0001450 624G 0001 001551 651G 0001 001576 661G 0001 001376
001421 6156 0001661 7116 0001 000673 ASAV 0001 002134 757G 0001 000267
001655 763G 0003716 ADRES2 0004 000075 ASAVFL 0003 000271
003715 ADRES1 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
000116 RESIM2 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
000426 CHNV 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
000102 DIJ 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
000066 DRUMAD 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
000103 ESUM 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
003711 I 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
003737 I 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
003715 INJPS 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
003720 IRC 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
003724 ISPLT 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
003740 JJ 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
003713 KKT 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
003732 LL 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
00275 MAPKEY 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
00464 NOCHAN 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
003734 NUCOMB 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
00466 NUSAQ 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
00070 PAS51Z 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
00076 RRD 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
00006 SEP 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
00372 SPLFIN 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
00000 STOP 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
000130 TOTFLD 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271
000961 TRFORH 0004 000655 BKFILE 0003 000075 ASAVFL 0003 000271

```

```

10 SUBROUTINE ISODATIC(PLACE,MEANS,N,STDEV,CLD,FLO,INF,AVP,AMN)
20 INCLUDE COMBK5,LIST
30 PARAMETER MAXPOP=60,MAXFEI=30
40 COMMON/PASS/STOP,LRCAT,MIN,RR,STD,MAX,D,LMIN,SEP,
50 MAP,SPTRIG, IAD?, K?ISP, NOPTS, PUNCH,
60 ICHN, CHNTHS, ICHNTR(MAXPOP),MDS,IBEGIN,BEGIN,
70 BEGIN2,BEGINS,CLSRAM,NOFLD,LPT,TOTRD,TOTPTS,
80 NCLASS,NOCLS,TOISUB,TOTFLD,TOTVAT,NOCL,NVRT
90 ,NRTCLS,NOFEAT,MAXCLS,FEV,EC100,SYMIX(160)
100 ,VARSIZ,STATKY,ISONKEY,MAPKEY,SEVENIZ01,PERCENT,SIMERP
110 ,IORDER,IURBIT,TRFILE,INT,IN,PRIN,SUBVEC(160),NOSUB2,CHNV(30)
120 ,NOCHAN,EXCORP,NOSEN
130 IMPLICIT INTEGER (*-X)
140 END
150 INCLUDE COMBK6,LIST
160 COMMON/GLOBAL/MEAD(42),MAPTAP,DATEP,ASAVTAP,BKFILE,BKKEY,
170 HISFIL,HISKEY,TRFORMER,PTP,ERPKY,MAPUNT,NOFILE,
180 DRUMAD,DRM,DDS,PAGSIZ,DATEFIL,STAFIL,ASAV,ASAVFL,
190 ,NHSTUN,NHSTFI,SCIRUN,MAPFIL
200
210
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30 END
40 EQUIVALENCE (SGM:IN,STOMAX)
50 MEAL MEANS,STUDY,SDIMAX,SEP,AVP,C,ANN,SGMA,SDIST,DIST,RND,
60 TEST,DH1,DLHIN,CLD,TIME,PERCENT,D1J
70 REAL ESUM,ESNT,MEAN10,60),SD1J
80 LOGICAL DEL
90 DIMENSION AVP(NOFEAT,MAXCLS),ISGM(MAXPOP)
100 DIMENSION C(NOFEAT,NOPTS),IPLACE(NOPTS)
110 DIMENSION ANN(NOFEAT,MAXCLS),SGM(MAXPOP)
120 DIMENSION MEANS(NOFEAT,MAXCLS),M(MAXCLS)
130 DIMENSION STDV(NOFEAT,MAXCLS),CLD(MAXCLS,NA,CLS)
140 DIMENSION PTR(160)
150 EQUIVALENCE (INDIM,NOFEAT), (LNCAT,INCAT)
160 DELETE, FALSE.
170 ISEQ=0
180 ISTOP=STOP
190 DO 5 I=1,MAXCLS
200 H(I)=0
210 DO 5 J=1,NOFEAT
220 ANN(J,I)=0.0
230 AVP(J,I)=0.0
240 5 KKT=1
250
260
270
280
290
300
310
320
330
340
350
360
370
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390
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410
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C
C
C

```

10 CONTINUE
DO 15 K=1,LNCAT
DO 15 J=1,NOFEAT
MEAN(J,K) = MEANS(J,K)
IF (LNCAT.LE.1.AND.KKT.GT.1) GO TO 500
ADDRESS=RLGNI
ICCT=NOPTS
IRC=IRD
IF (IRC.LL.1) ICCT=KPTS
IF (IRD.EQ.0) GO TO 40
IANDS=NOFEAT*ICCI
CALL RREAD(ADDRESS,C,IANDS,ISTAT)
ADDRESS=ADDRESS+IANDS
IF (ISTAT.EQ.1) GO TO -25
IF (ISTAT.EQ.0) GO TO 40
IF (ISTAT.EQ.1) GO TO 40
WRITE (6,30) ISTAT
FORMAT(1,ERROR HEADING DRUM---ISTAT=,I4)
CONTINUE
DO 100 I=1,ICCI
KK=1
IF (LNCAT.LT.2) GO TO 80
SDIST=IC*OE*20
DO 170 J=1,LNCAT
DIST=0.0
DO 50 K=1,NOFEAT
DIST=DIST + ABS(MEANS(K,J)-C(K,I))
60 KK=J
SDIST=SDIST
70 CONTINUE
80 CONTINUE

```

C
C
C

```

30 END EQUIVALENCE (SGMIN,STOMAX)
40 REAL MEANS,STDEV,STOMAX,SEP,AVP,C,AMN,SGMA,SDIST,DIST,RND,
50 TEST,DRIN,DLRIN,CLD,TIME,PERCEN,DIJ
60 REAL ESUM,ESWT,MEAN(30,60),SDIJ
70 LOGICAL DEL
80 DIMENSION AVP(NOFEAT,MAXCLS),ISGMA(MAXPOP)
90 DIMENSION C(NOFEAT,NOPTS),IPLACE(NOPTS)
100 DIMENSION AMN(NOFEAT,MAXCLS),SGMA(MAXPOP)
110 DIMENSION MEANS(NOFEAT,MAXCLS),N(MAXCLS)
120 DIMENSION STDEV(NOFEAT,MAXCLS),W(MAXCLS)
130 DIMENSION PTR(60)
140 EQUIVALENCE (KDIR,NOFEAT), (LNCAT,INCAT)
150 DELE=FALSE.
160 ISEQ=0
170 ISTOP=STOP
180 DO 5 I=1,MAXCLS
190 N(I)=0
200 DO 5 J=1,NOFEAT
210 AMN(J,I)=0.0
220 AVP(J,I)=0.0
230
240
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NEW

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15000150
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NEW
NEW
NEW

15000170

15000210
15000220
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15000250

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15000280
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ASSIGN DATA TO CLUSTERS

```

10 CONTINUE
15 DO 15 K=1,LNCAT
15 DO 15 J=1,NOFEAT
15 MEAN(J,K) = MEANS(J,K)
15 IF (LNCAT.LE.1,RND,EXT.GT.1) GO TO 530
15 ADRESI=REGINI
15 ADRES2=REGIHZ
15 ICCI=NOPTS
15 IRC=IRU
15 IF (IRC.LE.1) ICCI=KPTS
15 IF (IRD.EQ.0) GO TO 40
15 IARDS=NOFEAT*ICCI
15 CALL RREAD(ADRESI,C,IARDS,ISTAT)
15 ADRESI=ADRESI+IARDS
15 IF (ISTAT.EQ.1) GO TO 25
15 IF (ISTAT.EQ.0) GO TO 40
15 IF (ISTAT.EQ.-1) GO TO 40
15 WRITE (6,30) ISTAT
15 FORMAT(1,ERROR READING DRUM--(ISTAT=,14)
20 CONTINUE
20 DO 100 I=1,ICCI
20 KK=I
20 IF (LNCAT.LT.2) GO TO 30
20 SDIST=10.0E+20
20 DO 70 J=1,LNCAT
20 DISI=0.0
20 DO 50 K=1,NOFEAT
20 DIST=DIST + ABS(MEANS(K,J)-CIK,1))
20 IF (DIST-SDIST) 60,70,70
20 KK=J
20 SDIST=DIST
20 CONTINUE
20 CONTINUE

```

```

610 N(KK)=N(KK)+1
620 IPLACE(1)=KK
630 DO 90 K=1,NOFEAT
640 AMN(K,KK)=AMN(K,KK)+C(K,1)
650 AVP(K,KK)=AVP(K,KK)+C(K,1)*C(K,1)
660 CONTINUE
670 90 CONTINUE
680 100 CONTINUE
690 IF (IRND.EV.0) GO TO 110
700 CALL RWRITE(ADRES2,IPLACE,ICCT,ISIA,I)
710 ADRES2=ADRES2-ICCT
720 IF (IISTAT.EV.1) GO TO 105
730 IF (IRC=IRC-1)
740 CALL CLCK(TIME)
750 IF (MOD(KK,KKN)=0) WRITE(6,120) KK,TIME
760 FORMAT(' CUMULATIVE TIME AFTER ASSIGNING DATA TO CLUSTERS FOR ITER
770 ATION',I4,' IS',F10.6)
780 DO 130 K=1,LNCAI
790 RND=FLCAT(RN)
800 DO 130 J=1,NOFEAT
810 AMN(J,K)=AMN(J,K)/RND
820 MEANS(J,K)=AMN(J,K)
830 STDEV(J,K)=SQRT(AVP(J,K)/RND-AMN(J,K)*AMN(J,K))
840 IF (ERCOMP.NE.1) GO TO 135
850 ESUM=0.0
860 DO 132 J=1,NOFEAT
870 DO 132 K=1,LNCAI
880 ESUM=ESUM+N(K)*(STDEV(J,K))**2/TOTPTS
890 CONTINUE
900 ESUM=SQRT(ESUM)
910 WRITE(6,133) ESUM
920 FORMAT(1X,7.3/)
930 ERCOMP = 7.3/ESUM
940
950
960
970
980
990
1000
1010
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IS000440
IS000450
IS000470

IS000500
IS000510
IS000520

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IS000550
IS000560

IS000590
IS000610

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IS000640
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IS000660
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IS000680••-1

IS000710

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IS000750••-2

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•NEW
•NEW


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117 WRITE(6,160)K,M(K),PMIN,NOFEAT
118 FORMAT(/,CLUSTER,13,*,REMOVED FOR HAVING ONLY,16,*,POINTS,*)
119 * MIN. POINTS IS (1,14,*,*,12,*)
120 CALL DELETE(K)
121 DEL=.TRUE.
122 GO TO 164
123 CONTINUE
124 CONTINUE
125 CONTINUE
126 CONTINUE
127 CONTINUE
128 CONTINUE
129 CONTINUE
130 ON ITERATIONS 1 THRU N-I CHECK NIK) AGAINST NMIN
131 DO 180 K=1,INCAT
132 IF (M(K)-NMIN) 190,180,182
133 CONTINUE
134 IF (DEL)CALL CLOST(CLD,STDEV,MEANS)
135 GO TO 220
136 IF (MOD(KKI,KRN)) 200,1200
137 WRITE (6,210),N(K),NMIN
138 CALL DELETE(K)
139 DEL=.TRUE.
140 GO TO 173
141 FORMAT(9,CLUSTER,12,*,REMOVED FOR HAVING ONLY,16,*,
142 * ELEMENTS, MIN: NO: ELEMENTS IS,16)
143 CONTINUE
144 CONTINUE
145 CONTINUE
146 CONTINUE
147 CONTINUE
148 CONTINUE
149 CONTINUE
150 CONTINUE
151 CONTINUE
152 CONTINUE
153 CONTINUE
154 CONTINUE
155 CONTINUE
156 CONTINUE
157 CONTINUE
158 CONTINUE
159 CONTINUE
160 CONTINUE
161 CONTINUE
162 CONTINUE
163 CONTINUE
164 CONTINUE
165 CONTINUE
166 CONTINUE
167 CONTINUE
168 CONTINUE
169 CONTINUE
170 CONTINUE
171 CONTINUE
172 CONTINUE
173 CONTINUE
174 CONTINUE
175 CONTINUE
176 CONTINUE

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1770 C
1780 C
1790 C
1800 C
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1870 C
1880 C
1890 C
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2070 C
2080 C
2090 C
2100 C
2110 C
2120 C
2130 C
2140 C
2150 C
2160 C
2170 C
2180 C
2190 C
2200 C
2210 C
2220 C
2230 C
2240 C
2250 C
2260 C
2270 C
2280 C
2290 C
2300 C
2310 C
2320 C
2330 C
2340 C

IS SPLITTING REQUIRED
K=I
MCAT=INCAT
IF (K=MCAT) 290,290,500
IF (STDMAX-SGMARK) 300,300,310
IF (INIK)-(MIN+MAX) 310,310,320
K=K+J
GO TO 280

SPLIT CLUSTER K
TRIG1=I
DEL=.TRUE.
KA=ISGMARK
INCAT=INCAT+I
IF (INCAT.LE.MAXCLS) GO TO 350
IF (MOD(KNT,KRN).EQ.DIPRITE(6,3)) KKT
FORMAT(' MAXIMUM CLUSTERS ON I RATION:14') SPLITTING REQUIRED
LNCAT=MAXCLS
GO TO 350
INC=INCAT
LL=PTIM(K)
DO 370 I=1,KDIM
AMN(I,INC)=AMN(I,LL)
AMN(KX,LL)=AMN(KX,INC)+SEP*SGMARK
AMN(KI,INC)=AMN(KI,INC)-SEP*SGMARK
SGMARK=0.0
IF (MOD(KKT,KRN)) 400,400
WRITE(6,390) LL,KX,INC
FORMAT(' J CLUSTER ',I2) IS SPLIT IN THE ',I2,'IM PARAMETER INTO C
2 CLUSTER ',I2)
CONTINUE
K=K+I
GO TO 280

EVEN ITERATION
ARE CLUSTERS TO BE COMBINED
CONTINUE
DO 405 L=1,LNCAT
PTR(L)=I
NOCOMB=0
NUCLST=LNCAT-I
DO 440 L=1,NUCLST+.2
NOCLTR=LNCAT-I
K=0
DMIN=DLMIN
DO 430 I=1,NOCLTR
IF (PTR(I).EQ.0) GO TO 430
I=I+1
DO 425 J=1,LNCAT
IF (PTR(J).EQ.0) GO TO 425
15001200,0,0,0
15001210
15001220
15001230
15001240
15001250
15001260
15001270
15001280
15001290
15001300
15001310
15001320
15001330
15001340
15001350
15001360
15001380
15001390
15001400
15001410
15001420
15001440
15001490
15001500
15001510
15001530,0,0,1
15001550
15001560
15001570
15001580
15001590
15001600
15001610
15001620
15001630
15001640
15001650
15001660
15001670
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15001900
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15001930
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15001950
15001960
15001970
15001980
15001990
15002000
15002010
15002020
15002030
15002040
15002050
15002060
15002070
15002080
15002090
15002100
15002110
15002120
15002130
15002140
15002150
15002160
15002170
15002180
15002190
15002200
15002210
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15002300
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F 5 64

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1770 C
1780 C
1790 C
1800 C
1810 C
1820 C
1830 C
1840 C
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1860 C
1870 C
1880 C
1890 C
1900 C
1910 C
1920 C
1930 C
1940 C
1950 C
1960 C
1970 C
1980 C
1990 C
2000 C
2010 C
2020 C
2030 C
2040 C
2050 C
2060 C
2070 C
2080 C
2090 C
2100 C
2110 C
2120 C
2130 C
2140 C
2150 C
2160 C
2170 C
2180 C
2190 C
2200 C
2210 C
2220 C
2230 C
2240 C
2250 C
2260 C
2270 C
2280 C
2290 C
2300 C
2310 C
2320 C
2330 C
2340 C

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IS SPLITTING REQUIRED

KCAT=LNCAI
IF (K-NCAT) 293,290,500
270 IF (STDMAX-SGNNA(K)) 509,500,510
300 IF (NKI)-(NRMIN+NGIN*21) 510,510,520
310 KKK+1
GO TO 280

SPLIT CLUSTER K

TRIGI=1
DEL=TNUE
KX=ISGNNA(K)
LNCAI=LNCAI+1
IF (LNCAI-LE*MAXCLS) GO TO 350
IF (MOD(KNT,KNN))=1 WRITE(6,34) KKI
340 FORMAT(' MAXIMUM CLUSTERS OR ITERATION=',I4) SPLITTING REQUIRED
* BUT NOT PERFORMED */
LNCAI=MAXCLS
INC=LNCAI
GO TO 500

350
360 DO 370 I=1,KDIM
370 AMN(I,INC)=AMN(I,LL)
380 AMN(KX,LL)=AMN(KX,LL)+SEP*SGNA(K)
AMN(KX,INC)=AMN(KX,INC)+SEP*SGNA(K)
SGNA(K)=0
IF (MOD(KKI,KNN)) 400,400
390 WRITE(6,390) LL,KX,INC
FORMAT(' CLUSTER ',I2,' IS SPLIT IN THE ',I2,' IN PARAMETER INTO C
2 CLUSTER ',I2)
400 CONTINUE
K=K+1
GO TO 280

EVEN ITERATION
ARE CLUSTERS TO BE COMBINED

410 CONTINUE
DO 405 L=1,LNCAI
405 PTR(L)=1

NOCLN=0
NOCLSI=LNCAI-1
DO 440 L=1,NOCLSI,2
NOCLTR = LNCAI - 1
K=0
DO 430 I=1,NOCLTR
DRIN=DLMIN
IF (PTR(I)-EQ-0) GO TO 430
I=I+1
DO 425 J=1,LNCAI
IF (PTR(J)-EQ-0) GO TO 425

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15001200 NEW
15001210 NEW
15001220 NEW
15001230 NEW
15001240 NEW
15001250 NEW
15001260 NEW
15001270 NEW
15001280 NEW
15001290 NEW
15001300 NEW
15001310 NEW
15001320 NEW
15001330 NEW
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15001800 NEW
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15001850 NEW
15001860 NEW
15001870 NEW
15001880 NEW
15001890 NEW
15001900 NEW
15001910 NEW
15001920 NEW
15001930 NEW
15001940 NEW
15001950 NEW
15001960 NEW
15001970 NEW
15001980 NEW
15001990 NEW
15002000 NEW

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64


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2355  SDIJ = 0.0
2356  DO 420 JJ=1,NDIM
2357  SDIJ=SDIJ+((AMN(JJ,J))-AMN(JJ,J))*.2/(STDEV(JJ,J))
2358  CONTINUE
2359  DIJ=SWRT(SDIJ)
2360  C
2361  IF(DIJ.GT.DH:IN)GO TO 425
2362  DMIN=DIJ
2363  KK=J
2364  CONTINUE
2365  CONTINUE
2366  C
2367  IF(KK.EQ.0)GO TO 480
2368  PTR(KK)=0
2369  C
2370  COMBINE CLUSTERS KK AND XXX
2371  C
2372  DEL=.TRUE.
2373  RND=1.0 /FLOAT(N(KK)+N(XXX))
2374  C
2375  DO 460 K=1,KDIM
2376  AMN(K,KK)=(N(KK)+AMN(K,KK)+N(KKK))*RND
2377  C
2378  CALL DELETE(KKK)
2379  IF (KKK.EQ. (LNCAT+1)) GO TO 435
2380  C
2381  MOVE POINTERS UP
2382  C
2383  DO 175 K=KKK,LNCAT
2384  PTR(K) = PTR(K+1)
2385  C
2386  175  IF (MOD(KKT,KRN))440,450
2387  WRITE(6,990)K,KK,KKK,
2388  CONTINUE
2389  C
2390  440  CONTINUE
2391  450  FORMAT(' CLUSTERS ',I2,' AND ',I2,' HAVE BEEN COMBINED INTO CLUST
2392  2ER ',I2)
2393  C
2394  REINITIALIZE
2395  C
2396  CONTINUE
2397  DO 510 J=1,MAXCLS
2398  N(J)=J
2399  SGRA(J)=0.0
2400  ISGRA(J)=0
2401  DO 510 K=1,KDIM
2402  AVP(K,J)=0.0
2403  SIULV(K,J)=0.0
2404  MEANS(K,J)=0.0
2405  AMN(K,J)=0.0
2406  CONTINUE
2407  510  KKT=KKT+1
2408  DEL=.FALSE.
2409  GO TO 10
2410  C
2411  530  IF (KKT.NE.2) GO TO 550
2412  C
2413  C
2414  C
2415  C
2416  C
2417  C
2418  C
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2487  C
2488  C
2489  C
2490  C
2491  C
2492  C

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