DANIEL F. MERRIAM, Editor

CORFAN - FORTRAN IV COMPUTER PROGRAM FOR CORRELATION, FACTOR ANALYSIS (R- and Q-MODE) AND VARIMAX ROTATION

By

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and

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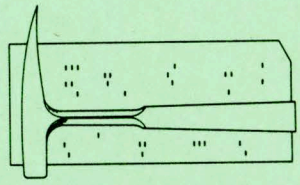

COMPUTER CONTRIBUTION 42
State Geological Survey
The University of Kansas, Lawrence
1970

in cooperation with the
American Association of Petroleum Geologists
Tulsa, Oklahoma

Editor's Remarks

This COMPUTER CONTRIBUTION 42, "CORFAN-FORTRAN IV computer program for correlation, factor analysis (R- and Q-mode) and varimax rotation", by C.W. Ondrick and G.S. Srivastava is an example of the larger more sophisticated programs now being developed. It embodies many "extras" not available in earlier programs of a similar nature. Because of complexity of the program, it is necessary to give detailed instructions on its use, but the rewards are greater for the effort as the results reflect the added analytical abilities. As stated by the authors the objectives of the programs are to (1) provide the researcher with a multivariate systems program package to accomplish maximum analysis with minimum computer runs, and to (2) analyze a large number of variables. Both objectives are met.

The program should find many uses in the earth sciences, especially in paleontology, sedimentology, and petrology. It provides a means of analyzing large amounts of data rapidly, and this is, of course, necessary in today's involved and complex scientific endeavors.

For a limited time the Geological Survey will make available on magnetic tape this computer program for $25.00 (US). If punched cards are needed an extra $10.00 is necessary to pay for handling and postage. An up-to-date, complete list of COMPUTER CONTRIBUTIONS can be obtained by writing, Editor, COMPUTER CONTRIBUTIONS, Kansas Geological Survey, University of Kansas, Lawrence, Kansas 66044.

Computer Contribution

1. Mathematical simulation of marine sedimentation with IBM 7090/7094 computers, by J.W. Harbaugh, 1966 . . . . . (out of print)
2. A generalized two-dimensional regression procedure, by J.R. Dempsey, 1966 . . $0.50
3. FORTRAN IV and MAP program for computation and plotting of trend surfaces for degrees 1 through 6, by Mont O'Leary, R.H. Lippert, and O.T. Spitz, 1966 . . . . $0.75
4. FORTRAN II program for multivariate discriminant analysis using an IBM 1620 computer, by J.C. Davis and R.J. Sampson, 1966 . . . . . $0.50
5. FORTRAN IV program using double Fourier series for surface fitting of irregularly spaced data, by W.R. James, 1966 . . . . . $0.75
6. FORTRAN IV program for estimation of cladistic relationships using the IBM 7040, by R.L. Bartcher, 1966 . . . . . $1.00
7. Computer applications in the earth sciences: Colloquium on classification procedures, edited by D.F. Merriam, 1966 . . . . . $1.00
8. Prediction of the performance of a solution gas drive reservoir by Muskat's equation, by Apolonio Baca, 1967 . . . . . $1.00
9. FORTRAN IV program for mathematical simulation of marine sedimentation with IBM 7040 or 7094 computers, by J.W. Harbaugh and W.J. Wahlstedt, 1967 . . . . $1.00

(continued on inside back cover)

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CORFAN-FORTRAN IV COMPUTER PROGRAM FOR CORRELATION, FACTOR ANALYSIS (R- AND Q-MODE) AND VARIMAX ROTATION

by

C.W. Ondrick and G.S. Srivastava

INTRODUCTION

The geological maze (algorithm) as described by Griffiths (1966) illustrates a procedure for problem solving in the geosciences. The researcher collects data, transforms it to normal, classifies, correlates, factors, rotates, separates populations and plots results. Physically, considering the large volumes of data usually involved, it would be difficult to manipulate the analysis with pencil and pad. The digital computer has provided a rapid and precise means of data analysis for the modern researcher. Computer programs have been written separately for correlation, factor analysis and varimax rotation, and are provided at many computer centers.

The objectives of this computer contribution are: (1) to provide the researcher with a multivariate systems program package containing correlation, factor analysis (both R- and Q-modes) and varimax rotation linked together in a single program with a minimum of required parameter cards and computer runs; and (2) to produce a program capable of analyzing large numbers of variables (100) and which to a large extent is machine independent. Computer Contribution 30 (Griffiths and Ondrick, 1968) provided the first stage in statistical data analysis, namely logarithmic transformation, classification and regression analysis of data. The program described here provides a means for accomplishing the second stage in the geological algorithm-multivariate statistical analysis.

Acknowledgments.- CORFAN is a composite of four computer programs (COREL, FAN, QMOD, and VROT) originally written in FORTRAN II for the IBM 7074 computer. We express our thanks to The Pennsylvania State University Computation Center staff for the base programs from which this program was constructed. We also wish to thank Prof. John C. Griffiths for reading the manuscript and giving helpful suggestions. The FORTRAN IV program was tested in the GE 635 at the University of Kansas Computation Center.

PROGRAM DESCRIPTION

The general layout of CORFAN is illustrated in the flow diagram of Figure 1. Program dimensions provide intercorrelations between a maximum of 100 variables (5050 correlation coefficients), R-mode factor analysis with a maximum computation of 100 factors, of which up to 60 may be rotated (Kaiser, 1958), and analysis of an unlimited number of samples.

In Q-mode factor analysis the samples become the variables and the variables the samples, therefore the program dimensions provide for analysis of 100 samples. A value COS θ (Imbrie and Purdy, 1962) is calculated for each pair of sample vectors and represents the input into factor analysis. Output from the Q-mode option includes IN (input matrix), DIV (divided matrix), and COS (Cos θ matrix) for each sample. The dimension restriction may be changed in statements MAIN 40, 45, and 91 to fit the core size required for a particular run. Card reader, printer and punch have been assigned variable names and their numerical designation may be altered in all subroutines by changing statements MAIN 80, 85, and 90 as desired.

There are 5 major options provided in this program: (1) correlation (including means and standard deviations); (2) correlation - R-mode factor analysis; (3) correlation - R mode factor analysis, varimax rotation; (4) Q-mode factor analysis; and (5) Q-mode factor analysis - varimax rotation. Additional options incorporated within the program are to punch correlation coefficients, alter diagonal elements of the correlation matrix, punch factor loadings, and bivariate plotting of input data or loadings of one factor against another, original or rotated. The "Hamburger Stand Option" (one with everything to go) produces a symmetrical correlation matrix of input variables and plots each variable against the other, calculates R-mode factor analysis for n factors, plots the factor loadings of each factor against the other, rotates J factors of the original factor matrix to "simple structure", and yields plots of the factor loadings of each rotated factor against the other. The number plotted on the output graph shows the number of points at that position, e.g. the number 2 indicates 2 points.

THOLEIITIC-ALKALIC BASALT PROBLEM

Defining the Problem

Eighty-six chemical analyses consisting of both tholeiitic and alkali basalt rocks from the Hawaiian

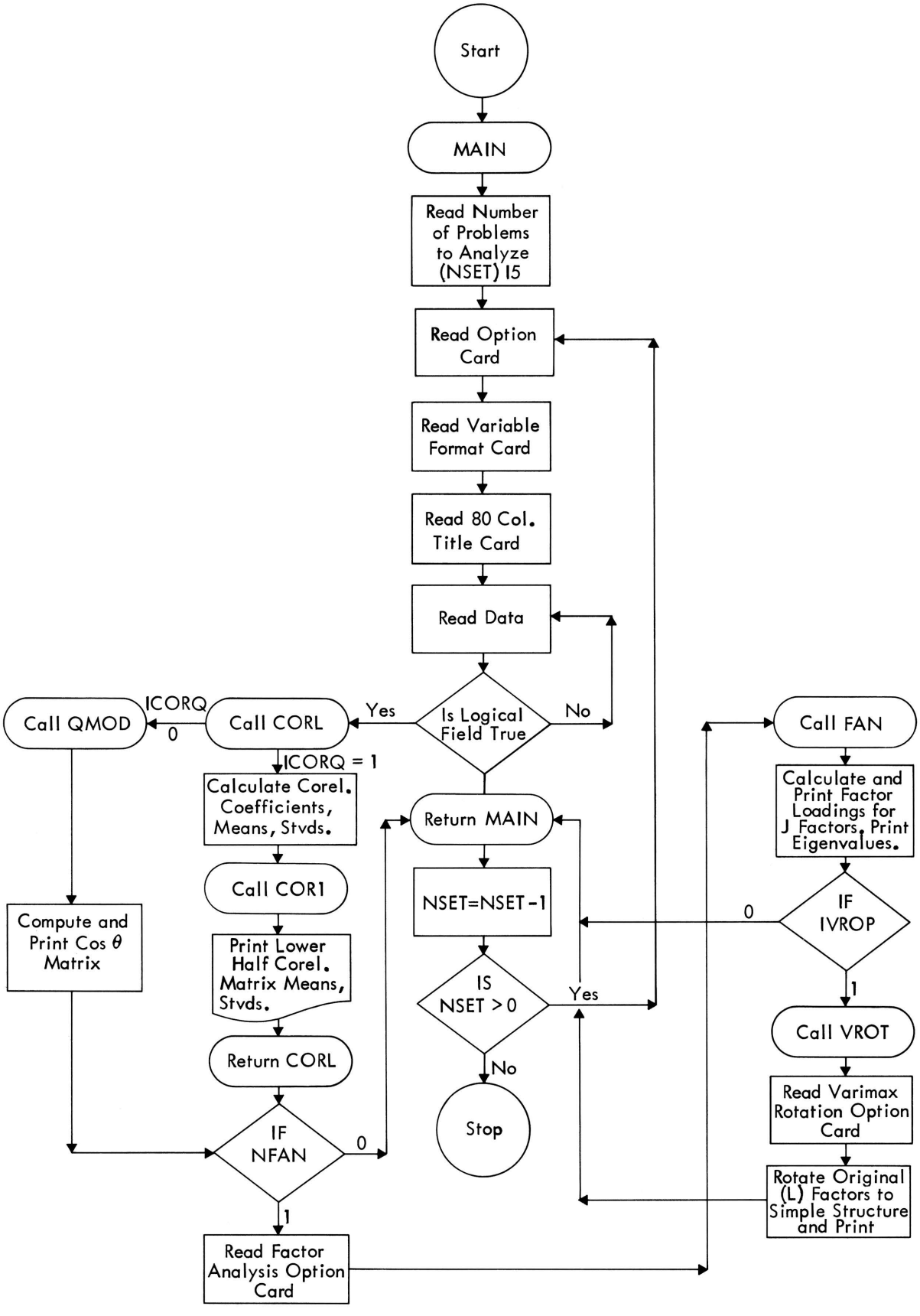

Figure 1. - Generalized flow diagram for CORFAN

Islands were subjected to factor analysis in the Q-mode for classification. Based upon simultaneous evaluation of 11 analyzed chemical oxides (SiO_2, TiO_2, Al_2O_3, Fe_2O_3, FeO, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5) from each sample with respect to the other samples; a continuous series of samples ranging from alkali basalts to tholeiites is discernible. The analysis suggests a complete compositional gradation in basaltic magmas from alkalic to tholeiitic as well as exhibiting the potential value of factor analysis in the Q-mode in classifying rocks.

Introduction

Confusion is not an unfamiliar feeling to the igneous petrologist while trying to understand the differences and origin of what have been termed tholeiitic and alkali basalts (a concise review of the problem is given by Chayes, 1966; also see Kuno, 1959; Poldervaart, 1964). Some investigators rely on chemical composition while others use normative mineral percents or mineral composition in distinguishing between tholeiites and alkali basalts.

If indeed a distinct difference exists between the rocks which have been termed tholeiites and those classified as alkali basalts, certain combinations of the chemical oxides SiO_2, TiO_2, Al_2O_3, Fe_2O_3, FeO, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5 when evaluated simultaneously for a group of samples should classify these samples into one of the two rock types or alternatively as neither. It is to be pointed out that the calculation of the percentage of normative minerals, given a rock of a particular chemical composition, and then the arbitrary assignment of certain percentages of these minerals as the "cut off" between the two rock types is a step executed only because the variation of the above 11 oxides composing the input for the norm calculation is not evaluated easily by the investigator. The simultaneous evaluation of 11 oxides of a particular sample with respect to other samples and then the classification of that sample based upon its overall similarity with the other samples is the concern of this example.

Procedure

In this investigation 86 chemical analyses of basaltic rocks from the Hawaiian Islands were selected randomly from over 200 analyses (C.P. Thornton, personal communication, 1969); 42 of these were classified by the investigators as tholeiites, 42 as alkali basalts and 2 were of unknown types. The norms of all rocks were calculated by computer. Then, the distinction between alkali and tholeiitic basalts was made based upon an arbitrary hypersthene value of 6 percent (A.J.R. White, personal communication, 1969), i.e. rocks containing greater than 6 percent normative hypersthene were classified as tholeiites and those with less than 6 percent were termed alkali basalts. After tentative classification of rocks as either alkali or tholeiitic basalts the oxide percentages of each sample were subjected to factor analysis in the Q-mode which leads to the classification of samples in relation to "end member" components (Imbrie and Purdy, 1962). Figure 2 demonstrates the position of the samples with respect to each other when the factor loadings of the two axes are plotted.

Results

On the basis of the Q-mode classification of the 86 rocks investigated, 46 were classified as tholeiites, 23 as alkali basalts, and 17 as intermediate between the two rock types (Table 1). Seven alkali basalts and 5 tholeiites were classified differently from that suggested by White. The original petrographic point-count classification is in disagreement with White's and the Q-mode classification almost entirely within those rocks classed as alkali basalt, but agrees, with two exceptions, with respect to the tholeiites.

Summary and Conclusions

Based on the above results it seems that the simultaneous evaluation of chemical oxides for a given sample of basalt, using equal weighting of the oxides, and the subsequent classification of this sample by factor analysis in the Q-mode, yields a continuous series from alkali to tholeiitic basalts (Fig. 2). This implies the existence of a complete compositional gradation in basaltic magmas from tholeiitic to alkalic and not two separate parent magmas as has been suggested previously. Using the above classification the similarity of any one given sample to the other samples can be evaluated with respect to the 11 analyzed chemical oxides.

The above analysis is not intended to prove that, with respect to chemical composition, a complete gradation from alkali basalts to tholeiitic exists, because the experiment is restricted to rocks of the Hawaiian Islands and only 88 samples have been investigated. It is intended however to illustrate the potential value of the above technique in classifying all types of rocks in future investigations.

PROGRAM COMPATIBILITY AND MODIFICATIONS

This version of CORFAN has been compiled and executed successfully on both the GE 635 and IBM System/360 Model 50 computers. The program requires no external subroutines and makes use only of the system library subroutine SQRT (square root) and library function ABS (absolute).

Plots of loadings of both the unrotated and rotated factors against each other yield a "square" scattergram (approximately equal horizontal and

vertical scales). The vertical (Y axis) scale may be altered by changing statements FAN 1730 and VROT 1305. The maximum and minimum scale values for both the vertical and horizontal scales may be altered by changing the numeric values of statements FAN 1710 through 1725 and VROT 1285 through 1300.

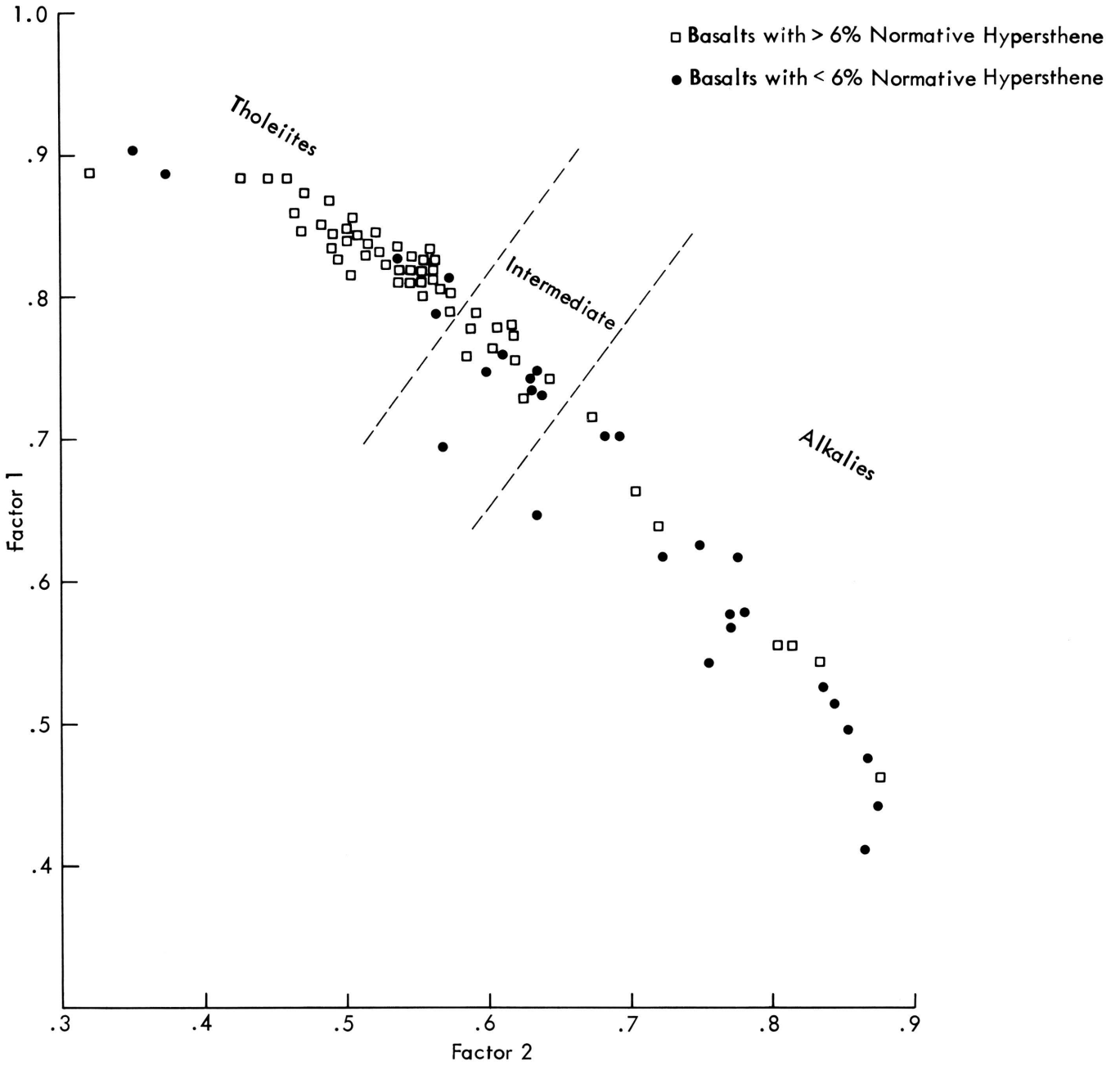

Figure 2. - Plots of loadings of rotated factor one against factor two and classification of basaltic samples on basis of factor analysis in Q-mode.

Table 1. - Classification of Hawaiian basalts as tholeiitic or alkalic by original investigator (petrographic), A.J.R. White (Normative) and Q-mode

Sample No.	Original Classification	White's Classification	Q-mode Classification
1	Alkali Basalt	Alkali Basalt	Alkali Basalt
2	Alkali Basalt	Alkali Basalt	Alkali Basalt
3	Alkali Basalt	Alkali Basalt	Alkali Basalt
4	Alkali Basalt	Tholeiitic Basalt	Tholeiitic Basalt
5	Alkali Basalt	Alkali Basalt	Alkali Basalt
6	Alkali Basalt	Alkali Basalt	Intermediate
7	Alkali Basalt	Tholeiitic Basalt	Alkali Basalt
8	Alkali Basalt	Alkali Basalt	Intermediate
9	Alkali Basalt	Alkali Basalt	Intermediate
10	Alkali Basalt	Alkali Basalt	Alkali Basalt
11	Alkali Basalt	Tholeiitic Basalt	Alkali Basalt
12	Alkali Basalt	Alkali Basalt	Alkali Basalt
13	Alkali Basalt	Alkali Basalt	Alkali Basalt
14	Alkali Basalt	Alkali Basalt	Alkali Basalt
15	Alkali Basalt	Alkali Basalt	Alkali Basalt
16	Alkali Basalt	Tholeiitic Basalt	Alkali Basalt
17	Alkali Basalt	Alkali Basalt	Tholeiitic Basalt
18	Alkali Basalt	Tholeiitic Basalt	Tholeiitic Basalt
19	Alkali Basalt	Tholeiitic Basalt	Intermediate
20	Alkali Basalt	Alkali Basalt	Alkali Basalt
21	Alkali Basalt	Alkali Basalt	Tholeiitic Basalt
22	Alkali Basalt	Tholeiitic Basalt	Tholeiitic Basalt
23	Alkali Basalt	Alkali Basalt	Tholeiitic Basalt
24	Alkali Basalt	Tholeiitic Basalt	Tholeiitic Basalt
25	Alkali Basalt	Tholeiitic Basalt	Tholeiitic Basalt
26	Alkali Basalt	Tholeiitic Basalt	Tholeiitic Basalt
27	Alkali Basalt	Tholeiitic Basalt	Tholeiitic Basalt
28	Alkali Basalt	Tholeiitic Basalt	Tholeiitic Basalt
29	Alkali Basalt	Tholeiitic Basalt	Tholeiitic Basalt
30	Alkali Basalt	Alkali Basalt	Tholeiitic Basalt
31	Alkali Basalt	Tholeiitic Basalt	Intermediate
32	Alkali Basalt	Alkali Basalt	Intermediate
33	Alkali Basalt	Alkali Basalt	Tholeiitic Basalt
34	Alkali Basalt	Tholeiitic Basalt	Intermediate
35	Alkali Basalt	Alkali Basalt	Intermediate
36	Alkali Basalt	Alkali Basalt	Intermediate
37	Alkali Basalt	Tholeiitic Basalt	Alkali Basalt
38	Alkali Basalt	Tholeiitic Basalt	Alkali Basalt
39	Alkali Basalt	Tholeiitic Basalt	Alkali Basalt
40-42	Alkali Basalt	Alkali Basalt	Alkali Basalt
43-69	Tholeiitic Basalt	Tholeiitic Basalt	Tholeiitic Basalt
70	Tholeiitic Basalt	Alkali Basalt	Alkali Basalt
71	Tholeiitic Basalt	Tholeiitic Basalt	Alkali Basalt
72-86	Tholeiitic Basalt	Tholeiitic Basalt	Tholeiitic Basalt

Program Input and Options

CARD 1

Col. 1-5	Number of sets of data (integer)

CARD 2

Col. 1-5	Total number of variables (integer)
Col. 6-10	Number of variables per data card (integer)
Col. 15	1 = Punch correlation matrix 0 = No punch of correlation matrix
Col. 16-23	Alphameric identification
Col. 30	1 = Produce factor analysis (see card 5) 0 = No factor analysis
Col. 35	1 = Produce varimax rotation (see card 6) 0 = No varimax rotation
Col. 40	1 = Produce correlation matrix which is input to R-mode factor analysis 0 = Cosine θ matrix generator which is input to Q-mode factor analysis
Col. 41	T = Bivariate plots of original data (see cards 5A, 6A) F = No plotting original data
Col. 42	T = Bivariate plots of unrotated factor loadings (see cards 6B, 7B) F = No plotting unrotated factor loadings
Col. 43	T = Bivariate plots of rotated factor loadings (see cards 7C, 8C) F = No plotting rotated factor loadings

(Examples of parameter card 2 are presented in Table 2)

CARD 3

Col. 1-80	Variable format card of the form (nFX.Y, L1) Where n is the number of variables per data card (cols. 6-10 of card 2), X is the field width, Y the number of decimal places, and L1 a logical field for termination)

CARD 4

Col. 1-80	Alphameric title card

Data cards

The data must be restricted to cols. 1 through 79 and the number of variables per data card are based on the number punched in cols. 6-10 of input card 2. For example if the total number of variables measured per sample is 29 and 8 variables are punched on a single card, 5 cards are required for each sample to input the 29 variables measured. Stack the 5 cards sequentially behind one another for each sample. Therefore if 100 samples were analyzed for 29 variables each, and 8 variables were punched per card 500 cards would be the data cards of this problem. The last card of a particular set of data must contain a "T" in L field defined by the variable format (parameter card 3 above).

Plotting original data option cards
Parameter cards for plotting original data if card 2 col. 41 option is "T".

CARD 5A

Col. 1-5	Number of bivariate original data maps desired.

CARD 6A

Col. 1-5	Index (integer) for Y variable to be plotted against X variable
Col. 6-15	Upper limit of Y variable in floating point format
Col. 16-25	Lower limit of Y variable in floating point format
Col. 26-30	Index (integer) of X variable to be plotted against Y variable
Col. 31-40	Upper limit of X variable in floating point format
Col. 41-50	Lower limit of X variable in floating point format
Col. 51-60	Plotting interval, along the Y (vertical) axis, in floating point format

Repeat 6A type card for the number of maps desired (number punched on card 5A)

Factor analysis option card (right justify all values)
Required if parameter card 2 col. 30 option is 1.

CARD 5

Col. 1-5	FACTORS. Number of factors (integer) to be extracted (number of eigenvalues to be found). This number must be less than or equal to the number of variables.
Col. 7-10	DIAGONAL. Leave blank or punch zeros if the diagonal elements of the matrix are to be assumed equal to 1.0. Punch 9999 if each diagonal element is to have the same value. This value then is punched on one diagonal card which follows this parameter card. Punch any other number if diagonal cards are supplied.
Col. 12-15	HISTORY. Leave blank or punch zeros if no history and statement records are desired. Punch 9999 to obtain history and statement records for debugging. Punch any other number to obtain history records only.
Col. 17-20	INPUT MATRIX. Leave blank or punch zeros if no printout of the input and residual matrices are desired. Punch 5555 if both are desired. Punch a number greater than 5555 if the printout of the residual matrix only is desired. Punch any number less than 5555 to obtain a

Table 2. - Examples of Parameter Card 2 for program input and options (right justify all parameters)

Operation	Total No. Variables	No. Variables Per Card	Correlation Punch	Title	FAN	VROT	COREL	PLOT*
Column	1-5	6-10	15	16-23	30	35	40	41 42 43
A. Correlation only-plot original data, no punch; 9 data cards/sample.	43	5	0	CORRELTS	0	0	1	T F F
B. Correlation only-no plot, punch; 4 data cards/sample.	29	8	1	CORRELTS	0	0	1	F F F
C. Correlation plus Factor Analysis (FAN)-no correlation punch; plot original data and factor loadings; 4 data cards/sample.	16	4	0	CORFANTS	1	0	1	T T F
D. Correlation plus FAN-correlation punch; plot original factor loadings but not original data; 9 data cards/sample.	87	10	1	CORFANTS	1	0	1	F T F
E. Correlation plus FAN plus Varimax Rotation (VROT)-no correlation punch; plot rotated factor loadings; 1 data card/sample.	8	8	0	CORFANVR	1	1	1	F F T
F. Correlation plus FAN plus VROT-correlation punch; plot original data and rotated factor loadings; 6 data cards/sample.	32	6	1	CORFANVR	1	1	1	T T T
G. Q-Mode plus FAN-no plot; 10 data cards/sample.	100	10	0	QMODFAN	1	0	0	F F F
H. Q-Mode plus FAN plus VROT; plot original factor loadings; 2 data cards/sample.	14	7	0	QMDFANVT	1	1	0	F T F

print out of the input matrix only.

Col. 22-25 PUNCH LOADINGS. Leave blank or punch zeros if no punched cards containing the factor loadings are desired. Punch any nonzero number to receive the punched cards.

Col. 27-30 MINIMUM VARIANCE. This option permits termination of factor extraction when the variance accounted for by the factor most recently extracted is less than a selected minimum variance. Leave blank or punch zeros to continue extracting factors as long as the variance for each factor is positive; or punch the minimum variance which is to terminate factor extraction. If this number is a decimal, punch the decimal point.

Diagonal cards option

As stated above if the diagonal elements are assumed to be 1.0, no diagonal cards are required. If each diagonal element is to have the same value a single diagonal card is required; place the value in the first 8 columns with format F8.5. Alternatively, if diagonal cards are supplied punch 8 diagonal values (from element (1.1) to element (8.8) etc.) per card in 8 digit fields covering columns 17-80. The fields have format F8.5.

Plotting of unrotated factor loadings option cards

Parameter cards for plotting unrotated factor loadings if card 2 col. 42 option is "T".

CARD 6B

Col. 1-5 Number of bivariate unrotated factor loading maps desired.

CARD 7B

Col. 1-5 Index (integer) of factor to be considered as Y axis.

Col. 6-10 Index (integer) of factor to be considered as X axis.

Repeat 7B type card for the number of maps desired (number punched on card 6B)

Varimax rotation option card (right justify all parameters)

Required if parameter card 2 col. 35 option is 1.

CARD 6

Col. 1-5 PRINT ORIGINAL FACTOR MATRIX. Leave blank or punch zeros if no printout of the original factor matrix is desired. Punch a nonzero integer number to obtain a printout of the input matrix.

Col. 7-10 PUNCH ROTATED LOADINGS. Leave blank if the rotated factor loadings are not to be punched. Punch 0001 to receive punched cards.

Col. 12-15 Number of original factors to be rotated (integer)

Plotting of rotated factor loadings option cards

Parameter cards for plotting rotated factor loadings if card 2 col. 43 option is "T".

CARD 7C

Col. 1-5 Number of bivariate rotated factor loading maps desired.

CARD 8C

Col. 1-5 Index (integer) of factor to be considered as Y axis

Col. 6-10 Index (integer) of factor to be considered as X axis

Repeat 8C type card for the number of maps desired (number punched on card 7C).

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C     ****************************************************************MAIN   5
C     ****************************CORFAN******************************MAIN  10
C     ****************************************************************MAIN  15
C     THIS PROGRAM REPRESENTS A COMPOSITE OF 4 LIBRARY COMPUTER PROGRAMSMAIN  20
C     WRITTEN BY THE STAFF AT THE PENNSYLVANIA STATE UNIVERSITY COMPUTERMAIN  25
C     CENTER COREL,QMOD,FAN AND VROT. THE PROGRAMS WERE LINKED TOGETHER MAIN  30
C     AND REVISED BY C. W. ONDRICK AND G. S. SRIVASTAVA JANUARY 1969.   MAIN  35
      DIMENSION SUM(100),VARS(100),SUMSQ(100),CP(5200),AVARS(100)       MAIN  40
      DIMENSION FMT(20),ISUM(100),X(100,100),A(5500),FM(100,100)        MAIN  45
      COMMON /TITLE/NO1,NO2, NUM,   NVR,IREA,IPRI,IPUN                  MAIN  50
      COMMON /CORR1/          N1,M,L,K,IZERO,NPUN,ICD,IND,ICOR          MAIN  55
      COMMON /CORR2/     FMT,NFMT                                       MAIN  60
      COMMON /FACTR/NFAN,IVROP,FANPLT,VARPLT,ORJPLT                     MAIN  65
      COMMON /TLABL/TTLE(20)                                            MAIN  70
      LOGICAL LCARD,ORJPLT,FANPLT,VARPLT                                MAIN  75
      IREA=5                                                            MAIN  80
      IPRI=6                                                            MAIN  85
      IPUN=43                                                           MAIN  90
      JUM = 100                                                         MAIN  91
C     ****************************************************************MAIN  95
C     READ NUMBER OF PROBLEMS TO BE ANALYZED                            MAIN 100
C     ****************************************************************MAIN 105
      READ (IREA,5) NSET                                                MAIN 110
    5 FORMAT (I5)                                                       MAIN 115
C     ****************************************************************MAIN 120
C     READ MASTER PARAMETER CARD                                        MAIN 125
C     ****************************************************************MAIN 130
   10 READ (IREA,45) N,NVR,NPUN,NO1,NO2,NFAN,IVROP,ICORQ,ORJPLT,FANPLT,VMAIN 135
     1ARPLT                                                             MAIN 140
   45 FORMAT (3I5,2A4,2X,3I5,3L1)                                       MAIN 145
      MCP = ((N*(N-1))/2)+N                                             MAIN 150
      K=0                                                               MAIN 155
      DO 25 I=1,N                                                       MAIN 160
      SUM(I)=0.                                                         MAIN 165
      SUMSQ(I)=0.                                                       MAIN 170
   25 VARS(I)=0.                                                        MAIN 175
      DO 30 I=1,MCP                                                     MAIN 180
   30 CP(I)=0.                                                          MAIN 185
      NUM=0                                                             MAIN 190
      IZERO=0                                                           MAIN 195
      ILLK=1                                                            MAIN 200
C     ****************************************************************MAIN 205
C     READ FORMAT FOR INPUT DATA                                        MAIN 210
C     ****************************************************************MAIN 215
      READ (IREA,50) FMT                                                MAIN 220
   50 FORMAT (20A4)                                                     MAIN 225
      READ (IREA,51) TTLE                                               MAIN 230
      WRITE(IPRI,52) TTLE                                               MAIN 235
   51 FORMAT (20A4)                                                     MAIN 240
   52 FORMAT(1H1,////////////////////////////20X,20A4)                  MAIN 245
C     ****************************************************************MAIN 250
C     READ RAW DATA                                                     MAIN 255
C     ****************************************************************MAIN 260
   55 READ (IREA,FMT) (AVARS(I),I=1,NVR),LCARD                          MAIN 265
      CALL COREL(LCARD,ICORQ,ILLK,SUM,VARS,SUMSQ,CP,AVARS,ISUM,N,MCP,X,AMAIN 275
     1,FM,JUM )                                                         MAIN 280
      IF (LCARD) GO TO 60                                               MAIN 285
      GO TO 55                                                          MAIN 290
   60 NSET=NSET-1                                                       MAIN 295
      IF (NSET.GT.0) GO TO 10                                           MAIN 300
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```
      WRITE (IPRI,65)                                                    MAIN 305
   65 FORMAT (1H0,23X,85H****YOUR REQUESTED COMPUTATION IS COMPLETE, ITSMAIN 310
     1 BEEN NICE DOING BUSINESS WITH YOU****)                            MAIN 315
      STOP                                                               MAIN 320
      END                                                                MAIN 325
      SUBROUTINE COREL(LCARD,ICORQ,ILLK,SUM,VARS,SUMSQ,CP,AVARS,ISUM,N, CORL   5
     1MCP,X,A,FM,JUM)                                                    CORL  10
C     ***********************************************************************CORL  15
C     ****************************CORRELATION********************************CORL  80
C     ***********************************************************************CORL  25
      DIMENSION SUM(JUM),VARS(JUM),SUMSQ(JUM),CP(MCP ),AVARS(JUM)        CORL  30
      DIMENSION FMT(20),ISUM(JUM),X(JUM,JUM),A(MCP ),FM(JUM,JUM)         CORL  35
      COMMON /TITLE/NO1,NO2, NUM,   NVR,IREA,IPRI,IPUN                   CORL  40
      COMMON /CORR1/          N1,M,L,K,IZERO,NPUN,ICD,IND,ICOR           CORL  45
      COMMON /CORR2/     FMT,NFMT                                        CORL  50
      COMMON /FACTR/NFAN,IVROP,FANPLT,VARPLT,ORJPLT                      CORL  55
      LOGICAL LCARD,ORJPLT,FANPLT,VARPLT                                 CORL  60
      IF (NPUN-N)  5,5,25                                                CORL  65
    5 IF (N-120)  10,10,15                                               CORL  70
   10 IF (N-NVR)  15,35,35                                               CORL  75
   15 WRITE (IPRI,20)                                                    CORL  80
   20 FORMAT (1H1,58HREREAD THE WRITE UP, YOUR NUMBER OF VARIABLES IS INCORL  85
     1CORRECT)                                                           CORL  90
      GO TO 220                                                          CORL  95
   25 WRITE (IPRI,30)                                                    CORL 100
   30 FORMAT (1H1,61HNO. OF VARIABLES TO BE PUNCHED EXCEEDS TOTAL NO. OFCORL 105
     1 VARIABLES)                                                        CORL 110
      GO TO 220                                                          CORL 115
   35 DO 55 I=1,NVR                                                      CORL 120
      K=K+1                                                              CORL 125
      VARS(K)=AVARS(I)                                                   CORL 130
      FM(ILLK,K)=VARS(K)                                                 CORL 135
      X(K,ILLK)=VARS(K)                                                  CORL 140
      IF (K-N)  55,60,55                                                 CORL 145
   55 CONTINUE                                                           CORL 150
      IF (LCARD) GO TO 110                                               CORL 155
      RETURN                                                             CORL 160
   60 DO 70 K=1,N                                                        CORL 165
      SUM(K)=SUM(K)+VARS(K)                                              CORL 170
      SUMSQ(K)=SUMSQ(K)+(VARS(K)*VARS(K))                                CORL 175
   70 CONTINUE                                                           CORL 180
      K=0                                                                CORL 185
      DO 100 I=2,N                                                       CORL 190
      L=I-1                                                              CORL 195
      DO 100 J=1,L                                                       CORL 200
      K=K+1                                                              CORL 205
  100 CP(K)=CP(K)+(VARS(I)*VARS(J))                                      CORL 210
      NUM=NUM+1                                                          CORL 215
      ILLK=ILLK+1                                                        CORL 220
      K=0                                                                CORL 225
      IF (LCARD) GO TO 110                                               CORL 230
      RETURN                                                             CORL 235
  110 IF(ORJPLT) GO TO 250                                               CORL 240
      GO TO 111                                                          CORL 245
  250 READ(IREA,1000) NMAP                                               CORL 250
 1000 FORMAT(I5)                                                         CORL 255
 1001 FORMAT(I5,2F10.0,I5,3F10.0)                                        CORL 260
      DO 251 MAP = 1,NMAP                                                CORL 265
      READ(IREA,1001) I1,XMAX,XMIN,I2,YMAX,YMIN,XINT                     CORL 270
      WRITE(IPRI,9999)                                                   CORL 275
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 9999 FORMAT(1H1)                                                        CORL 280
      WRITE(IPRI,3005)I1,I2                                              CORL 285
 3005 FORMAT(45X29HSCATTERGRAM  OF ORIGINAL DATA,/,50X,8HVARIABLE,I4,2X,CORL 290
     13HVS.,I4,//)                                                       CORL 295
  251 CALL PLOT(FM,XMAX,XMIN,YMAX,YMIN,XINT,NUM,I1,I2,JUM)               CORL 300
  111 DO 131 I=1,ILLK                                                    CORL 305
      DO 131 J=1,N                                                       CORL 310
  131 FM(I,J) = 0.                                                       CORL 315
      IF (ICORQ.EQ.0) GO TO 205                                          CORL 320
      COUNT=NUM                                                          CORL 325
      DO 145 I=1,N                                                       CORL 330
C     ******************************************************************CORL 335
C     CALCULATE MEANS VARS(I) AND VARIANCES SUMSQ(I)                     CORL 340
C     ******************************************************************CORL 345
      VARS(I)=SUM(I)/COUNT                                               CORL 350
      SUMSQ(I)=(SUMSQ(I)/(COUNT-1.))-(VARS(I)**2)*(COUNT/(COUNT-1.))     CORL 355
      CONTINUE                                                           CORL 360
      IF (SUMSQ(I))  135,135,140                                         CORL 365
  135 IZERO=IZERO+1                                                      CORL 370
      SUMSQ(I)=0.                                                        CORL 375
      GO TO 145                                                          CORL 380
  140 SUMSQ(I)=SQRT(SUMSQ(I))                                            CORL 385
  145 CONTINUE                                                           CORL 390
      K=0                                                                CORL 395
      DO 175 I=2,N                                                       CORL 400
      L=I-1                                                              CORL 405
      DO 175 J=1,L                                                       CORL 410
      K=K+1                                                              CORL 415
C     ******************************************************************CORL 420
C     CALCULATE CORRELATION COEFFICIENTS CP(K)                           CORL 425
C     ******************************************************************CORL 430
      CP(K)=(CP(K)-(VARS(I)*SUM(J)))/((COUNT-1.)*SUMSQ(I)*SUMSQ(J))      CORL 435
      IF (CP(K).GT.999.99)CP(K)=999.99                                   CORL 440
  175 CONTINUE                                                           CORL 445
      N1=N-1                                                             CORL 450
      ISUM(1)=1                                                          CORL 455
      DO 195 L=1,N1                                                      CORL 460
  195 ISUM(L+1)=ISUM(L)+1                                                CORL 465
      CALL COR1(SUM,VARS,SUMSQ,CP,AVARS,ISUM,N,MCP,JUM)                  CORL 470
      IF (NFAN.EQ.1) GO TO 210                                           CORL 475
      RETURN                                                             CORL 480
  205 CALL QMOD (SUM,VARS,SUMSQ,CP,AVARS,ISUM,N,MCP,X,NN,JUM,JSAMP)      CORL 485
      NUM=JSAMP                                                          CORL 490
      GO TO 212                                                          CORL 495
C     ******************************************************************CORL 500
C     READ PARAMETER CARD FOR FACTOR ANALYSIS                            CORL 505
C     ******************************************************************CORL 510
  210 NN=N                                                               CORL 515
  212 READ (IREA,215) J,IDIAG,IHSTY,IMTRX,IVMX,AB                        CORL 520
  215 FORMAT (5I5,F5.0)                                                  CORL 525
      CALL FAN(J,IDIAG,IHSTY,IMTRX,IVMX,AB,SUM,VARS,SUMSQ,CP,AVARS,      CORL 530
     1ISUM,NN,MCP,A,FM,JUM)                                              CORL 535
      GO TO 230                                                          CORL 540
  220 WRITE (IPRI,225)                                                   CORL 545
  225 FORMAT (5X,38HWHOOPS....WRONG DATA  CHECK AGAIN,CLOD)              CORL 550
      STOP                                                               CORL 555
  230 RETURN                                                             CORL 560
      END                                                                CORL 565
      SUBROUTINE COR1(SUM,VARS,SUMSQ,CP,AVARS,ISUM,N,MCP,JUM)            COR1   5
C     ******************************************************************COR1  10
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      PRINTS THE LOWER HALF OF THE SYMMETRIC CORRELATION MATRIX,MEANS   COR1  15
      AND STANDARD DEVIATIONS.                                         COR1  20
      ******************************************************************COR1  25
      DIMENSION SUM(JUM),VARS(JUM),SUMSQ(JUM),CP(MCP ),AVARS(JUM)      COR1  30
      DIMENSION FMT(20),ISUM(JUM)                                      COR1  35
      COMMON /TITLE/NO1,NO2, NUM,    NVR,IREA,IPRI,IPUN                COR1  40
      COMMON /CORR1/           N1,M,L,K,IZERO,NPUN,ICD,IND,ICOR        COR1  45
      COMMON /CORR2/      FMT,NFMT                                     COR1  50
      COMMON /FACTR/NFAN,IVROP,FANPLT,VARPLT,ORJPLT                    COR1  55
      LOGICAL LCARD,ORJPLT,FANPLT,VARPLT                               COR1  60
      WRITE (IPRI,885)                                                 COR1  65
      WRITE (IPRI,890) NUM,NO1,NO2                                     COR1  70
      IF (N-15)  20,20,55                                              COR1  75
   20 WRITE (IPRI,870) (ISUM(I),I=1,N1)                                COR1  80
      M=1                                                              COR1  85
      DO 45 I=2,N                                                      COR1  90
      M=M+(I-2)                                                        COR1  95
      L=M+(I-2)                                                        COR1 100
   45 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 105
      GO TO 660                                                        COR1 110
   55 WRITE (IPRI,870) (ISUM(I),I=1,15)                                COR1 115
      M=1                                                              COR1 120
      DO 80 I=2,16                                                     COR1 125
      M=M+(I-2)                                                        COR1 130
      L=M+(I-2)                                                        COR1 135
   80 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 140
      IF (N-16)  660,660,90                                            COR1 145
   90 DO 105 I=17,N                                                    COR1 150
      M=M+(I-2)                                                        COR1 155
      L=M+14                                                           COR1 160
  105 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 165
      IF (N-60)  125,120,115                                           COR1 170
  115 IF (N-62)  120,120,125                                           COR1 175
  120 WRITE (IPRI,940)                                                 COR1 180
  125 IF (N-30)  130,130,165                                           COR1 185
  130 WRITE (IPRI,880) (ISUM(I),I=16,N1)                               COR1 190
      M=106+15                                                         COR1 195
      DO 155 I=17,N                                                    COR1 200
      M=M+(I-2)                                                        COR1 205
      L=M+I-17                                                         COR1 210
  155 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 215
      GO TO 660                                                        COR1 220
  165 WRITE (IPRI,880) (ISUM(I),I=16,30)                               COR1 225
      M=106+15                                                         COR1 230
      DO 190 I=17,31                                                   COR1 235
      M=M+(I-2)                                                        COR1 240
      L=M+I-17                                                         COR1 245
  190 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 250
      IF (N-31)  660,660,200                                           COR1 255
  200 DO 215 I=32,N                                                    COR1 260
      M=M+(I-2)                                                        COR1 265
      L=M+14                                                           COR1 270
  215 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 275
      IF (N-79)  235,230,225                                           COR1 280
  225 IF (N-81)  230,230,235                                           COR1 285
  230 WRITE (IPRI,940)                                                 COR1 290
  235 IF (N-45)  240,240,275                                           COR1 295
  240 WRITE (IPRI,880) (ISUM(I),I=31,N1)                               COR1 300
      M=436+30                                                         COR1 305
      DO 265 I=32,N                                                    COR1 310
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      M=M+(I-2)                                                        COR1 315
      L=M+I-32                                                         COR1 320
  265 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 325
      GO TO 660                                                        COR1 330
  275 WRITE (IPRI,880) (ISUM(I),I=31,45)                               COR1 335
      M=436+30                                                         COR1 340
      DO 300 I=32,46                                                   COR1 345
      M=M+(I-2)                                                        COR1 350
      L=M+I-32                                                         COR1 355
  300 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 360
      IF (N-46)  660,660,310                                           COR1 365
  310 DO 325 I=47,N                                                    COR1 370
      M=M+(I-2)                                                        COR1 375
      L=M+14                                                           COR1 380
  325 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 385
      IF (N-94)  345,340,335                                           COR1 390
  335 IF (N-96)  340,340,345                                           COR1 395
  340 WRITE (IPRI,940)                                                 COR1 400
  345 IF (N-60)  350,350,385                                           COR1 405
  350 WRITE (IPRI,880) (ISUM(I),I=46,N1)                               COR1 410
      M=991+45                                                         COR1 415
      DO 375 I=47,N                                                    COR1 420
      M=M+I-2                                                          COR1 425
      L=M+I-47                                                         COR1 430
  375 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 435
      GO TO 660                                                        COR1 440
  385 WRITE (IPRI,880) (ISUM(I),I=46,60)                               COR1 445
      M=991+45                                                         COR1 450
      DO 410 I=47,61                                                   COR1 455
      M=M+I-2                                                          COR1 460
      L=M+I-47                                                         COR1 465
  410 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 470
      IF (N-61)  660,660,420                                           COR1 475
  420 DO 435 I=62,N                                                    COR1 480
      M=M+I-2                                                          COR1 485
      L=M+14                                                           COR1 490
  435 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 495
      IF (N-75)  445,445,480                                           COR1 500
  445 WRITE (IPRI,880) (ISUM(I),I=61,N1)                               COR1 505
      M=1771+60                                                        COR1 510
      DO 470 I=62,N                                                    COR1 515
      M=M+I-2                                                          COR1 520
      L=M+I-62                                                         COR1 525
  470 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 530
      GO TO 660                                                        COR1 535
  480 WRITE (IPRI,880) (ISUM(I),I=61,75)                               COR1 540
      M=1771+60                                                        COR1 545
      DO 505 I=62,76                                                   COR1 550
      M=M+I-2                                                          COR1 555
      L=M+I-62                                                         COR1 560
  505 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 565
      IF (N-76)  660,660,515                                           COR1 570
  515 DO 530 I=77,N                                                    COR1 575
      M=M+I-2                                                          COR1 580
      L=M+14                                                           COR1 585
  530 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 590
      IF (N-90)  540,540,575                                           COR1 595
  540 WRITE (IPRI,880) (ISUM(I),I=76,N1)                               COR1 600
      M=2776+75                                                        COR1 605
      DO 565 I=77,N                                                    COR1 610
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      M=M+I-2                                                          COR1 615
      L=M+I-77                                                         COR1 620
  565 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 625
      GO TO 660                                                        COR1 630
  575 WRITE (IPRI,880) (ISUM(I),I=76,90)                               COR1 635
      M=2776+75                                                        COR1 640
      DO 600 I=77,91                                                   COR1 645
      M=M+I-2                                                          COR1 650
      L=M+I-77                                                         COR1 655
  600 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 660
      IF (N-91)  660,660,610                                           COR1 665
  610 DO 625 I=92,N                                                    COR1 670
      M=M+I-2                                                          COR1 675
      L=M+14                                                           COR1 680
  625 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 685
      IF(N-105)631,631,632                                             COR1 690
  631 WRITE (IPRI,880) (ISUM(I),I=91,N1)                               COR1 695
      M=4006+90                                                        COR1 700
      DO 655 I=92,N                                                    COR1 705
      M=M+I-2                                                          COR1 710
      L=M+I-92                                                         COR1 715
  655 WRITE (IPRI,875) I,(CP(K),K=M,L)                                 COR1 720
      GO TO 660                                                        COR1 725
  632 WRITE(IPRI,880)(ISUM(I),I=91,105)                                COR1 730
      M=4006+90                                                        COR1 735
      DO 633 I=92,106                                                  COR1 740
      M=M+I-2                                                          COR1 745
      L=M+I-92                                                         COR1 750
  633 WRITE(IPRI,875)I,(CP(K),K=M,L)                                   COR1 755
      IF(N-106)660,660,634                                             COR1 760
  634 DO 636 I=107,N                                                   COR1 765
      M=M+I-2                                                          COR1 770
      L=M+14                                                           COR1 775
  636 WRITE(IPRI,875) I,(CP(K),K=M,L)                                  COR1 780
      IF(N-120)637,637,639                                             COR1 785
  637 WRITE(IPRI,880)(ISUM(I),I=106,N1)                                COR1 790
      M=4226+105                                                       COR1 795
      DO 638 I=107,N                                                   COR1 800
      M=M+I-2                                                          COR1 805
      L=M+I-77                                                         COR1 810
  638 WRITE(IPRI,875)I,(CP(K),K=M,L)                                   COR1 815
      GO TO 660                                                        COR1 820
  639 WRITE(IPRI,880)(ISUM(I),I=106,120)                               COR1 825
  660 IF (IZERO)  665,670,665                                          COR1 830
  665 WRITE (IPRI,930) IZERO                                           COR1 835
      GO TO 670                                                        COR1 840
  670 WRITE (IPRI,910) NO1,NO2                                         COR1 845
      WRITE (IPRI,925)                                                 COR1 850
      M=1                                                              COR1 855
      L=10                                                             COR1 860
  690 IF (L-N)  695,710,710                                            COR1 865
  695 WRITE (IPRI,915) M,L,(VARS(K),K=M,L)                             COR1 870
      M=M+10                                                           COR1 875
      L=L+10                                                           COR1 880
      GO TO 690                                                        COR1 885
  710 WRITE (IPRI,915) M,N,(VARS(K),K=M,N)                             COR1 890
      WRITE (IPRI,920)                                                 COR1 895
      WRITE (IPRI,925)                                                 COR1 900
      M=1                                                              COR1 905
      L=10                                                             COR1 910
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  730 IF (L-N)  735,755,755                                              COR1 915
  735 WRITE (IPRI,915) M,L,(SUMSQ(K),K=M,L)                              COR1 920
      M=M+10                                                             COR1 925
      L=L+10                                                             COR1 930
      GO TO 730                                                          COR1 935
  755 WRITE (IPRI,915) M,N,(SUMSQ(K),K=M,N)                              COR1 940
      IF (NPUN)  860,860,765                                             COR1 945
  765 ICD=(NPUN+5)/6                                                     COR1 950
      M=1                                                                COR1 955
      DO 785 I=1,ICD                                                     COR1 960
      L=M+5                                                              COR1 965
      WRITE (IPUN,895) NO1,NO2,I,(VARS(K),K=M,L)                         COR1 970
  785 M=M+6                                                              COR1 975
      M=1                                                                COR1 980
      DO 805 I=1,ICD                                                     COR1 985
      L=M+5                                                              COR1 990
      WRITE (IPUN,900) NO1,NO2,I,(SUMSQ(K),K=M,L)                        COR1 995
  805 M=M+6                                                              COR11000
      IND=1                                                              COR11005
      DO 820 I=2,NPUN                                                    COR11010
  820 IND=IND+(I-2)                                                      COR11015
      IND=IND+NPUN-2                                                     COR11020
      ICOR=(IND+7)/8                                                     COR11025
      M=1                                                                COR11030
      DO 850 I=1,ICOR                                                    COR11035
      L=M+7                                                              COR11040
      WRITE (IPUN,905) NO1,NO2,I,(CP(K),K=M,L)                           COR11045
  850 M=M+8                                                              COR11050
      WRITE (IPUN,935) NO1,NO2,NUM,NPUN                                  COR11055
  860 WRITE (IPRI,865) NO1,NO2                                           COR11060
  865 FORMAT (1H0,25HSTATISTICS COMPLETED FOR ,2A4/)                      COR11065
  870 FORMAT (1H0,3(4X,5I7))                                             COR11070
  875 FORMAT (1H ,I3,2X,5F7.3,2(4X,5F7.3))                               COR11075
  880 FORMAT (1H1,3(4X,5I7))                                             COR11080
  885 FORMAT (1H1,45X,28HSYMMETRIC CORRELATION MATRIX)                   COR11085
  890 FORMAT (1H0,34X,12HNUMBER CASES,I7,10X,14HPROBLEM NAME   ,2A4)     COR11090
  895 FORMAT (2A4,9H MEAN  CD,I3,6F10.3)                                 COR11095
  900 FORMAT (2A4,9HST DEV CD,I3,6F10.3)                                 COR11100
  905 FORMAT (2A4,5H COR ,I3,8F8.5)                                      COR11105
  910 FORMAT (1H1,15X,5HMEANS,6X,2A4)                                    COR11110
  915 FORMAT (1H ,I3,4H TO ,I3,3X,10F10.3)                               COR11115
  920 FORMAT (1H0,15X,19HSTANDARD DEVIATIONS)                            COR11120
  925 FORMAT (11H  VARIABLES)                                            COR11125
  930 FORMAT (1H0,I3,2X,81HVARIABLES HAVE ZERO VARIANCE. CORRELATIONS WHCOR11130
     1ICH INCLUDE THEM ARE PRINTED *00.000)                              COR11135
  935 FORMAT (2A4,2X,7HNO.OBS.,I7,6X,5HVARS.,I5)                         COR11140
  940 FORMAT (1H1)                                                       COR11145
      RETURN                                                             COR11150
      END                                                                COR11155
      SUBROUTINE QMOD(SUM,VARS,SUMSQ,COS,AVARS,ISUM,N,MCP,X,NN,JUM,  JS)QMOD    5
C     ************************************************************************QMOD   10
C     ************************Q-MODE COSINE*******************************QMOD   15
C     ************************************************************************QMOD   20
      DIMENSION SUM(JUM),VARS(JUM),SUMSQ(JUM),COS(MCP ),AVARS(JUM)        QMOD   25
      DIMENSION XMAX(120),SQ(120),X(JUM,JUM)                              QMOD   30
      COMMON /TITLE/NO1,NO2, ISAMP, NVR,IREA,IPRI,IPUN                    QMOD   35
      COMMON /FACTR/NFAN,IVROP,FANPLT,VARPLT,ORJPLT                       QMOD   40
      LOGICAL LCARD,ORJPLT,FANPLT,VARPLT                                  QMOD   45
C     ************************************************************************QMOD   50
C     THE ORIGINAL INPUT DATA ENTERS THIS SUBROUTINE AS X(I,J).           QMOD   55
C     ************************************************************************QMOD   60
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      IVAR = N                                                          QMOD  65
      IF (IVAR)  5,110,5                                                QMOD  70
    5 NTOT=ISAMP*(ISAMP-1)/2                                            QMOD  75
C     ***************************************************************QMOD  80
C      PRINT INPUT MATRIX                                               QMOD  85
C     ***************************************************************QMOD  90
      WRITE (IPRI,10)                                                   QMOD  95
   10 FORMAT (1H1)                                                      QMOD 100
      WRITE (IPRI,15) NO1,NO2                                           QMOD 105
   15 FORMAT (1H ,55X,13HPROBLEM NAME ,2A4//)                           QMOD 110
      IF(IVAR.LT.13)GO TO 21                                            QMOD 115
      DO 20 J=1,ISAMP                                                   QMOD 120
      WRITE (IPRI,25) J,(X(I,J),I=1,13)                                 QMOD 125
      IF(IVAR.EQ.13)GO TO 31                                            QMOD 130
   20 WRITE (IPRI,30) (X(I,J),I=14,IVAR)                                QMOD 135
      GO TO 31                                                          QMOD 140
   21 DO 22 J=1,ISAMP                                                   QMOD 145
   22 WRITE(IPRI,25)J,(X(I,J),I=1,IVAR)                                 QMOD 150
   25 FORMAT (1H ,3HIN ,I3,13F9.4)                                      QMOD 155
   30 FORMAT (1H ,3HIN ,3X,13F9.4)                                      QMOD 160
C     ***************************************************************QMOD 165
C     ZERO XMAX AREA                                                    QMOD 170
C     ***************************************************************QMOD 175
   31 DO 35 I=1,IVAR                                                    QMOD 180
   35 XMAX(I)=0.0                                                       QMOD 185
C     ***************************************************************QMOD 190
C      FIND MAXIMUM FOR EACH VARIABLE                                   QMOD 195
C     ***************************************************************QMOD 200
      DO 45 I=1,IVAR                                                    QMOD 205
      DO 45 J=1,ISAMP                                                   QMOD 210
      IF (XMAX(I)-X(I,J))  40,40,45                                     QMOD 215
   40 XMAX(I)=X(I,J)                                                    QMOD 220
   45 CONTINUE                                                          QMOD 225
C     ***************************************************************QMOD 230
C     DIVIDE ORIGINAL VALUES BY XMAX                                    QMOD 235
C     ***************************************************************QMOD 240
      DO 50 I=1,IVAR                                                    QMOD 245
      DO 50 J=1,ISAMP                                                   QMOD 250
   50 X(I,J)=X(I,J)/XMAX(I)                                             QMOD 255
C     ***************************************************************QMOD 260
C      PRINT MATRIX OF DIVIDED VALUES                                   QMOD 265
C     ***************************************************************QMOD 270
      WRITE (IPRI,10)                                                   QMOD 275
      WRITE (IPRI,15) NO1,NO2                                           QMOD 280
      DO 55 J=1,ISAMP                                                   QMOD 285
      WRITE (IPRI,60) J,(X(I,J),I=1,13)                                 QMOD 290
   55 WRITE (IPRI,65) (X(I,J),I=14,IVAR)                                QMOD 295
   60 FORMAT (1H ,3HDIV,I3,13F9.5)                                      QMOD 300
   65 FORMAT (1H ,3HDIV,3X,13F9.5)                                      QMOD 305
C     ***************************************************************QMOD 310
C      ZERO SUMS OF SQUARES                                             QMOD 315
C     ***************************************************************QMOD 320
      DO 70 I=1,ISAMP                                                   QMOD 325
   70 SQ(I)=0.0                                                         QMOD 330
C     ***************************************************************QMOD 335
C     ***************************************************************QMOD 340
C        ZERO COS AREA                                                  QMOD 345
C     ***************************************************************QMOD 350
      DO 75 I=1,MCP                                                     QMOD 355
   75 COS(I)=0.0                                                        QMOD 360
```

```
C      ******************************************************************QMOD  365
C      COMPUTE SUMS OF SQUARES                                            QMOD  370
C      ******************************************************************QMOD  375
       DO 80 J=1,ISAMP                                                    QMOD  380
       DO 80 I=1,IVAR                                                     QMOD  385
   80  SQ(J)=SQ(J)+X(I,J)**2                                              QMOD  390
C      ******************************************************************QMOD  395
C       COMPUTE COSINES OF THETA                                          QMOD  400
C      ******************************************************************QMOD  405
       K=0                                                                QMOD  410
       DO 90 II=2,ISAMP                                                   QMOD  415
       JJMAX=II-1                                                         QMOD  420
       DO 90 JJ=1,JJMAX                                                   QMOD  425
       BUM=0.0                                                            QMOD  430
       DO 85 I=1,IVAR                                                     QMOD  435
   85  BUM=BUM+X(I,JJ)*X(I,II)                                            QMOD  440
       K=K+1                                                              QMOD  445
   90  COS(K)=BUM/SQRT(SQ(II)*SQ(JJ))                                     QMOD  450
C      ******************************************************************QMOD  455
C      PRINT COSINE MATRIX                                                QMOD  460
C      ******************************************************************QMOD  465
       WRITE (IPRI,10)                                                    QMOD  470
       ICARD=1                                                            QMOD  475
       J=1                                                                QMOD  480
       JBEG=1                                                             QMOD  485
       JEND=8                                                             QMOD  490
   95  WRITE (IPRI,100) ICARD,(COS(J),J=JBEG,JEND)                        QMOD  495
  100  FORMAT (6HOCOS  ,I3,10F10.5)                                       QMOD  500
       IF (JEND-NTOT)  105,110,110                                        QMOD  505
  105  J=J+1                                                              QMOD  510
       JBEG=JBEG+8                                                        QMOD  515
       JEND=JEND+8                                                        QMOD  520
       ICARD=ICARD+1                                                      QMOD  525
       GO TO 95                                                           QMOD  530
  110  NOLL=N                                                             QMOD  535
       NN  =ISAMP                                                         QMOD  540
       JS = NOLL                                                          QMOD  545
       RETURN                                                             QMOD  550
       END                                                                QMOD  555
       SUBROUTINE FAN(M,IDIAG,IHSTY,IMTRX,IVMX,AB,SUM,VARS,SUMSQ,CP,AVARSFAN    5
      1,ISUM,N,MCP,A,FM,JUM)                                              FAN   10
C      ******************************************************************FAN   15
C      ************************FACTOR ANALYSIS***************************FAN   20
C      ******************************************************************FAN   25
       DIMENSION A(MCP ),X(120),Y(120),Z(120),CP(MCP )                    FAN   30
       DIMENSION VARS(JUM),AVARS(JUM),ISUM(JUM),FM(JUM,JUM)               FAN   35
       COMMON /TITLE/NO1,NO2, NUM,   NVR,IREA,IPRI,IPUN                   FAN   40
       COMMON /FACTR/NFAN,IVROP,FANPLT,VARPLT,ORJPLT                      FAN   45
       LOGICAL LCARD,ORJPLT,FANPLT,VARPLT                                 FAN   50
       COMMON /TLABL/TTLE(20)                                             FAN   55
       JOT=1                                                              FAN   60
       WRITE (IPRI,10)                                                    FAN   65
   10  FORMAT (1H1,////////51X,29HPRINCIPAL COMPONENTS ANALYSIS//)         FAN   70
       WRITE (IPRI,15)TTLE                                                FAN   75
   15  FORMAT (1H ,25X,20A4//)                                            FAN   80
       WRITE (IPRI,25) NO1,NO2,N,M                                        FAN   85
   25  FORMAT (1H ,36X,12HPROBLEM NAME,2X,2A4,10X,I3,12H VARIABLES ,,I3,8FAN   90
      1H FACTORS//)                                                       FAN   95
       IABC=AB                                                            FAN  100
       ABC=AB                                                             FAN  105
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      IF (N)  1140,1140,45                                                  FAN  110
   45 IF (N-120)  50,50,1150                                                FAN  115
   50 IF (M)  1160,1160,55                                                  FAN  120
   55 IF (M-120)  60,60,1170                                                FAN  125
   60 IF (N-M)  1180,65,65                                                  FAN  130
   65 IF (IABC-N)  70,70,1200                                               FAN  135
   70 IF (IDIAG)  80,150,75                                                 FAN  140
   75 IF (IDIAG-9999)  80,150,80                                            FAN  145
C     ************************************************************************FAN  150
C     READ DIAGONAL CARDS (OPTIONAL)                                        FAN  155
C     ************************************************************************FAN  160
   80 NCARD=((N+7)/8)-1                                                     FAN  165
      MI=1                                                                  FAN  170
      IF (NCARD)  115,115,95                                                FAN  175
   95 DO 110 I=1,NCARD                                                      FAN  180
      L=MI+7                                                                FAN  185
      READ (IREA,130) (X(K),K=MI,L)                                         FAN  190
  110 MI=MI+8                                                               FAN  195
  115 IREMN=N-(8*NCARD)                                                     FAN  200
      L=MI+IREMN-1                                                          FAN  205
      READ (IREA,130) (X(K),K=MI,L)                                         FAN  210
  130 FORMAT (16X,8F8.5)                                                    FAN  215
      K=(I*(I-1)/2)+I                                                       FAN  220
      DO 145 I=1,N                                                          FAN  225
  145 A(K)=X(I)                                                             FAN  230
C     ************************************************************************FAN  235
C     START OF CALCULATION                                                  FAN  240
C     ************************************************************************FAN  245
  150 CONTINUE                                                              FAN  250
      NVOTQ=N*(N-1)/2                                                       FAN  255
      I=2                                                                   FAN  260
      J=1                                                                   FAN  265
      DO 170 IN=1,NVOTQ                                                     FAN  270
      K=(I*(I-1)/2)+J                                                       FAN  275
      A(K)=CP(IN)                                                           FAN  280
      IF (I-J-1)  155,155,165                                               FAN  285
  155 I=I+1                                                                 FAN  290
      IF (NVOTQ-I)  185,160,160                                             FAN  295
  160 J=1                                                                   FAN  300
      GO TO 170                                                             FAN  305
  165 J=J+1                                                                 FAN  310
  170 CONTINUE                                                              FAN  315
C     ************************************************************************FAN  320
C     PUT A SINGLE NUMBER ON THE DIAGONAL (OPTIONAL)                        FAN  325
C     ************************************************************************FAN  330
      IF (IDIAG.EQ.0) GO TO 185                                             FAN  335
      IF (IDIAG.LT.9999) GO TO 205                                          FAN  340
      READ (IREA,180) X(1)                                                  FAN  345
  180 FORMAT (F8.5)                                                         FAN  350
      GO TO 190                                                             FAN  355
  185 X(1)=1.0                                                              FAN  360
  190 DO 200 I=1,N                                                          FAN  365
      K=(I*(I-1)/2)+I                                                       FAN  370
  200 A(K)=X(1)                                                             FAN  375
  205 IF (IMTRX-5555)  210,215,235                                          FAN  380
  210 IF (IMTRX)  215,235,215                                               FAN  385
  215 KEY=0                                                                 FAN  390
      WRITE (IPRI,225) N,N                                                  FAN  395
  225 FORMAT (1H1,27X,69HSYMMETRIC (CORRELATION) MATRIX -LOWER HALF -ELEFAN  400
     1MENT(1,1) TO ELEMENT (,I3,1H,,I3,1H)/)                                FAN  405
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      GO TO 965                                                          FAN  410
  235 B=N                                                                FAN  415
      C=M                                                                FAN  420
      TOL3G=5.E-6                                                        FAN  425
      SWI=1.000                                                          FAN  430
      FACT=1.000                                                         FAN  435
      DO 265 I=1,N                                                       FAN  440
  265 Z(I)=1.000/B                                                       FAN  445
C     ******************************************************************FAN  450
C     RETURN TO 9999 TO EXTRACT NEXT FACTOR                              FAN  455
C     ******************************************************************FAN  460
  270 YSUM=1.000                                                         FAN  465
      DIFFY=0.000                                                        FAN  470
      DIFFS=0.000                                                        FAN  475
      RATS=0.000                                                         FAN  480
      RATSD=0.000                                                        FAN  485
      TOL3=0.000                                                         FAN  490
      VITER=0.000                                                        FAN  495
      DO 310 I=1,N                                                       FAN  500
      XXXX=I                                                             FAN  505
  310 X(I)=Z(I)+2.E-6*XXXX                                               FAN  510
C     ******************************************************************FAN  515
C     RETURN TO 2222 TO PERFORM AN ITERATION                             FAN  520
C     ******************************************************************FAN  525
  315 SUM=0.000                                                          FAN  530
      DO 325 I=1,N                                                       FAN  535
  325 Y(I)=0.000                                                         FAN  540
C     ******************************************************************FAN  545
C     MULTIPLY MATRICES Y=A*X                                            FAN  550
C     ******************************************************************FAN  555
      DO 355 I=1,N                                                       FAN  560
      KO=(I*(I-1))/2                                                     FAN  565
      DO 350 J=1,I                                                       FAN  570
      K=KO+J                                                             FAN  575
  350 Y(I)=A(K)*X(J)+Y(I)                                                FAN  580
  355 CONTINUE                                                           FAN  585
      L=N-1                                                              FAN  590
      DO 390 I=1,L                                                       FAN  595
      K=I+1                                                              FAN  600
      DO 385 J=K,N                                                       FAN  605
      KOT=(J*(J-1)/2)+I                                                  FAN  610
  385 Y(I)=A(KOT)*X(J)+Y(I)                                              FAN  615
  390 CONTINUE                                                           FAN  620
      DO 400 I=1,N                                                       FAN  625
  400 SUM=SUM+ABS(Y(I))                                                  FAN  630
C     ******************************************************************FAN  635
C     RETURN TO 3333 AFTER AN EXTRAPOLATION                              FAN  640
C     ******************************************************************FAN  645
  405 DIFS9=0.000                                                        FAN  650
      DO 415 I=1,N                                                       FAN  655
  415 Y(I)=Y(I)/SUM                                                      FAN  660
      DO 425 I=1,N                                                       FAN  665
  425 DIFS9=DIFS9+ABS(Y(I)-X(I))                                         FAN  670
      DIFFY=SUM-YSUM                                                     FAN  675
      YSUM=SUM                                                           FAN  680
      IF(DIFFS.EQ.0.)GO TO 426                                           FAN  685
      V5FG=DIFS9/DIFFS                                                   FAN  690
  426 IF (V5FG.GT.99999.9)V5FG=0.000                                     FAN  695
      RATSD=V5FG-RATS                                                    FAN  700
      RATS=V5FG                                                          FAN  705
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      DIFFS=DIFS9                                                          FAN  710
      DIFS9=1.000-V5FG                                                     FAN  715
      VITER=VITER+1.000                                                    FAN  720
      TOL3=(VITER*VITER)*DIFS9*TOL3G                                       FAN  725
C     ***************************************************************FAN  730
C     PRINT HISTORY RECORD (OPTIONAL)                                      FAN  735
C     ***************************************************************FAN  740
      IF (IHSTY)  480,525,480                                              FAN  745
  480 IF (VITER-1.000)  515,485,515                                        FAN  750
  485 WRITE (IPRI,490)                                                     FAN  755
  490 FORMAT (1H1,//4X,13HHISTORY CARDS/)                                  FAN  760
      WRITE (IPRI,500)                                                     FAN  765
  500 FORMAT (1H ,9HFACT ITER,9X,4HYSUM,14X,5HDIFFY,13X,5HDIFFS,15X,4HRAFAN  770
     1TS,12X,5HRATSD,11X,4HTOL3)                                           FAN  775
      WRITE (IPRI,510)                                                     FAN  780
  510 FORMAT (1H ,49X,20H(CHECKS CONVERGENCE))                             FAN  785
  515 WRITE (IPRI,520) FACT,VITER,YSUM,DIFFY,DIFFS,RATS,RATSD,TOL3         FAN  790
  520 FORMAT (1H ,2F4.0,4X,3E18.8,4X,3E16.8)                               FAN  795
C     ***************************************************************FAN  800
C     TESTS FOR CONVERGENCE                                                FAN  805
C     ***************************************************************FAN  810
  525 DIFS9=FACT                                                           FAN  815
      IF (VITER*FACT*.2E-8-ABS(DIFFS))  535,680,680                        FAN  820
  535 IF (2.E-7-ABS(DIFFS-2.000)-ABS(DIFFY)-ABS(RATS-1.000))  540,665,66FAN  825
     15                                                                    FAN  830
  540 IF (-ABS(RATSD))  545,1105,545                                       FAN  835
  545 IF (-ABS(RATSD)+TOL3)  555,550,550                                   FAN  840
  550 IF (-ABS(RATSD)+ABS(RATS))  600,1105,600                             FAN  845
  555 IF (TOL3)  560,1105,1105                                             FAN  850
  560 IF (1.E-2-ABS(RATSD))  1105,565,565                                  FAN  855
  565 IF (ABS(DIFFS)-1.E-3)  1105,575,570                                  FAN  860
  570 IF (ABS(DIFFS)-1.000)  575,1105,1105                                 FAN  865
C     ***************************************************************FAN  870
C     ENTER EXTRAPOLATION ROUTINE-TYPE 1                                   FAN  875
C     ***************************************************************FAN  880
  575 V5FG=1.000                                                           FAN  885
      IF (IHSTY-9999)  595,585,595                                         FAN  890
  585 WRITE (IPRI,590) VITER                                               FAN  895
  590 FORMAT (1H ,13HSTATEMENT 490,F5.0)                                   FAN  900
  595 SWI=0.000                                                            FAN  905
C     ***************************************************************FAN  910
C     ENTER EXTRAPOLATION ROUTINE-TYPE 2                                   FAN  915
C     ***************************************************************FAN  920
  600 SUM=0.000                                                            FAN  925
      DO 635 I=1,N                                                         FAN  930
      Y(I)=-V5FG*X(I)+Y(I)                                                 FAN  935
      IF (Y(I)-10.000)  620,1190,1190                                      FAN  940
  620 DIFS9=Y(I)                                                           FAN  945
      IF (SWI)  630,635,630                                                FAN  950
  630 Z(I)=Y(I)-X(I)                                                       FAN  955
  635 SUM=SUM+ABS(DIFS9)                                                   FAN  960
      IF (IHSTY-9999)  655,645,655                                         FAN  965
  645 WRITE (IPRI,650) VITER                                               FAN  970
  650 FORMAT (1H ,14HSTATEMENT 5555,F5.0)                                  FAN  975
  655 SWI=0.000                                                            FAN  980
      GO TO 405                                                            FAN  985
C     ***************************************************************FAN  990
C     ARRIVE AT 6666 IF A FACTOR HAS BEEN EXTRACTED                        FAN  995
C     ***************************************************************FAN 1000
  665 WRITE (IPRI,670)                                                     FAN 1005
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  670 FORMAT (1H1,60HNEGATIVE ROOT ENCOUNTERED.  FACTOR LOADINGS ARE IMAFAN 1010
     1GINARY.  )                                                        FAN 1015
      SUM=-SUM                                                          FAN 1020
  680 SS=0.000                                                          FAN 1025
      IF (IHSTY-9999)  700,690,700                                      FAN 1030
  690 WRITE (IPRI,695) VITER                                            FAN 1035
  695 FORMAT (1H ,14HSTATEMENT 6666,F5.0)                               FAN 1040
  700 DO 705 I=1,N                                                      FAN 1045
  705 SS=SS+(Y(I)*Y(I))                                                 FAN 1050
      ANORM=SQRT(SS)                                                    FAN 1055
      DEFLG=SUM/SS                                                      FAN 1060
      IF (DEFLG.GT.99999.9)PCHFG=0.000                                  FAN 1065
      IF (SUM)  735,725,725                                             FAN 1070
  725 PCHFG=SQRT(DEFLG)                                                 FAN 1075
      GO TO 740                                                         FAN 1080
  735 PCHFG=0.000                                                       FAN 1085
  740 S1828=1.000                                                       FAN 1090
C     ******************************************************************FAN 1095
C     PRINT THE RESULTS                                                 FAN 1100
C     ******************************************************************FAN 1105
      WRITE (IPRI,750)                                                  FAN 1110
  750 FORMAT (1H1,//24X,6HFACTOR,5X,4HTEST,6X,6HFACTOR,7X,8HVARIANCE,7X,FAN 1115
     111HEIGENVECTOR,5X,10HITERATIONS)                                  FAN 1120
      WRITE (IPRI,760)                                                  FAN 1125
  760 FORMAT (1H ,23X,6HNUMBER,4X,6HNUMBER,5X,7HLOADING,4X,12H(EIGENVALUFAN 1130
     1E),21X,8HREQUIRED)                                                FAN 1135
      DO 770 IMAX=1,N                                                   FAN 1140
  770 X(IMAX)=0.000                                                     FAN 1145
      DO 840 I=1,N                                                      FAN 1150
      S1830=Y(I)/ANORM                                                  FAN 1155
      S1829=PCHFG*Y(I)                                                  FAN 1160
      IFACT=FACT                                                        FAN 1165
      I1828=S1828                                                       FAN 1170
      ITER=VITER                                                        FAN 1175
      IF (I1828-1)  820,805,820                                         FAN 1180
  805 WRITE (IPRI,810) IFACT,I1828,S1829,SUM,S1830,ITER                 FAN 1185
  810 FORMAT (1H ,23X,I4,I10,2F14.5,F16.5,I13)                          FAN 1190
      GO TO 830                                                         FAN 1195
  820 WRITE (IPRI,825) I1828,S1829,S1830                                FAN 1200
  825 FORMAT (1H ,27X,I10,F14.5,14X,F16.5)                              FAN 1205
  830 S1828=S1828+1.000                                                 FAN 1210
      X(I)=S1829                                                        FAN 1215
      FM(I,JOT)=X(I)                                                    FAN 1220
  840 CONTINUE                                                          FAN 1225
      JOT=JOT+1                                                         FAN 1230
      IF (SUM)  875,850,850                                             FAN 1235
  850 IF (IVMX)  855,875,855                                            FAN 1240
C     ******************************************************************FAN 1245
C     PUNCH FACTOR LOADING CARDS FOR VARIMAX ROTATION (OPTIONAL)        FAN 1250
C     ******************************************************************FAN 1255
  855 ICOR=(N-1)/6+1                                                    FAN 1260
      IVM=1                                                             FAN 1265
      DO 865 JIM=1,ICOR                                                 FAN 1270
      IEND=IVM+5                                                        FAN 1275
      WRITE (IPUN,870) NO1,NO2,IFACT,JIM,(X(IW),IW=IVM,IEND)            FAN 1280
  865 IVM=IVM+6                                                         FAN 1285
  870 FORMAT (2A4,1X,3HFCT,I3,2HCD,I3,6F10.5)                           FAN 1290
C     ******************************************************************FAN 1295
C     TEST IF LAST FACTOR OR MINIMUM VARIANCE HAS BEEN REACHED.         FAN 1300
C     ******************************************************************FAN 1305
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  875 IF (FACT-C)  880,885,880                                          FAN 1310
  880 IF (SUM-ABC)  885,895,895                                         FAN 1315
  885 KING=1                                                            FAN 1320
      GO TO 910                                                         FAN 1325
  895 SWI=FACT+1.000                                                    FAN 1330
      FACT=SWI                                                          FAN 1335
      KING=0                                                            FAN 1340
C     ******************************************************************FAN 1345
C     DEFLATION SUBROUTINE                                              FAN 1350
C     ******************************************************************FAN 1355
  910 DO 935 I=1,N                                                      FAN 1360
      LUM=(I*(I-1)/2)                                                   FAN 1365
      DO 935 J=1,I                                                      FAN 1370
      K=LUM+J                                                           FAN 1375
      A(K)=(-Y(I)*Y(J)*DEFLG)+A(K)                                      FAN 1380
  935 CONTINUE                                                          FAN 1385
C     ******************************************************************FAN 1390
C     TEST TO SEE IF CURRENT PROBLEM IS FINISHED                        FAN 1395
C     ******************************************************************FAN 1400
      IF (KING-1)  270,945,270                                          FAN 1405
  945 IF (IMTRX-5555)  1135,950,950                                     FAN 1410
  950 WRITE (IPRI,955) N,N                                              FAN 1415
  955 FORMAT (1H1,27X,28HPRINT OUT OF RESIDUAL MATRIX,2X,38H-LOWER HALF FAN 1420
     1-ELEMENT(1,1) TO ELEMENT (,I3,1H,,I3,1H)/)                        FAN 1425
      KEY=1                                                             FAN 1430
C     ******************************************************************FAN 1435
C     PRINT INPUT AND/OR RESIDUAL MATRICES (BOTH OPTIONAL)              FAN 1440
C     ******************************************************************FAN 1445
  965 DO 970 L=1,N                                                      FAN 1450
  970 ISUM(L)=L                                                         FAN 1455
      JAS=1                                                             FAN 1460
      KOR=15                                                            FAN 1465
      MASS=1                                                            FAN 1470
      IF (N-KOR)  995,995,1040                                          FAN 1475
  995 WRITE (IPRI,1000) (ISUM(I),I=JAS,N)                               FAN 1480
 1000 FORMAT (1H ,1X,5(2X,3I7))                                         FAN 1485
      GO TO 1015                                                        FAN 1490
 1005 WRITE (IPRI,1010) (ISUM(I),I=JAS,N)                               FAN 1495
 1010 FORMAT (1H1,1X,5(2X,3I7))                                         FAN 1500
 1015 DO 1030 I=JAS,N                                                   FAN 1505
      MASS=MASS+(I-1)                                                   FAN 1510
      L=MASS+(I-JAS)                                                    FAN 1515
 1030 WRITE (IPRI,1100) I,(A(K),K=MASS,L)                               FAN 1520
      IF (KEY-1)  23[illegible],1135,235                                FAN 1525
 1040 JAS14=JAS+14                                                      FAN 1530
      JAS15=JAS+15                                                      FAN 1535
      WRITE (IPRI,1000) (ISUM(I),I=JAS,JAS14)                           FAN 1540
      GO TO 1050                                                        FAN 1545
 1045 JAS14=JAS+14                                                      FAN 1550
      JAS15=JAS+15                                                      FAN 1555
      WRITE (IPRI,1010) (ISUM(I),I=JAS,JAS14)                           FAN 1560
 1050 DO 1065 I=JAS,JAS14                                               FAN 1565
      MASS=MASS+(I-1)                                                   FAN 1570
      L=MASS+(I-JAS)                                                    FAN 1575
 1065 WRITE (IPRI,1100) I,(A(K),K=MASS,L)                               FAN 1580
      DO 1085 I=JAS15,N                                                 FAN 1585
      MASS=MASS+(I-1)                                                   FAN 1590
      L=MASS+14                                                         FAN 1595
 1085 WRITE (IPRI,1100) I,(A(K),K=MASS,L)                               FAN 1600
      JAS=JAS+15                                                        FAN 1605
```

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      BASS=MASS                                                          FAN 1610
      BAS=JAS                                                            FAN 1615
      BASS=(BAS/2.000)*(BAS-1.000)+1.000                                 FAN 1620
      MASS=BASS                                                          FAN 1625
      KOR=KOR+15                                                         FAN 1630
      IF (N-KOR)  1005,1005,1045                                         FAN 1635
 1100 FORMAT (1H ,I3,5(2X,3F7.3))                                        FAN 1640
C     ******************************************************************FAN 1645
C     SET UP NEXT ITERATION                                              FAN 1650
C     ******************************************************************FAN 1655
 1105 DO 1110 I=1,N                                                      FAN 1660
 1110 X(I)=Y(I)                                                          FAN 1665
      IF (IHSTY-9999)  1130,1120,1130                                    FAN 1670
 1120 WRITE (IPRI,1125) VITER                                            FAN 1675
 1125 FORMAT (1H ,14HSTATEMENT 1002,F5.0)                                FAN 1680
 1130 GO TO 315                                                          FAN 1685
 1135 IF(FANPLT) GO TO 2001                                              FAN 1690
      GO TO 1136                                                         FAN 1695
 2001 READ(IREA,2003) NMAP                                               FAN 1700
 2003 FORMAT(I5)                                                         FAN 1705
      XMAX = 1.0                                                         FAN 1710
      XMIN = -1.0                                                        FAN 1715
      YMAX = 1.0                                                         FAN 1720
      YMIN = -1.0                                                        FAN 1725
      XINT = .0333                                                       FAN 1730
      DO 2005 MAP=1,NMAP                                                 FAN 1735
      READ(IREA,2006) NF1,NF2                                            FAN 1740
      WRITE(IPRI,9999)                                                   FAN 1745
 9999 FORMAT(1H1)                                                        FAN 1750
      WRITE(IPRI,3006)NF1,NF2                                            FAN 1755
 3006 FORMAT(45X,30HSCATTERGRAM OF  FACTOR LOADING,/,50X, 6HFACTOR,I4,2XFAN 1760
     13HVS.,I4,//)                                                       FAN 1765
 2005 CALL PLOT(FM,  XMAX,XMIN,YMAX,YMIN,XINT,N,NF1,NF2,JUM)             FAN 1770
 2006 FORMAT(2I5)                                                        FAN 1775
 1136 IF(IVROP.EQ.0) RETURN                                              FAN 1780
      IF (NFAN.EQ.0) STOP                                                FAN 1785
      CALL VROT(FM,N,M,JUM)                                              FAN 1790
      RETURN                                                             FAN 1795
C     ******************************************************************FAN 1800
C     ERROR MESSAGES CAUSED BY MISTAKES IN INPUT OR OVERFLOWS            FAN 1805
C     ******************************************************************FAN 1810
 1140 WRITE (IPRI,1145)                                                  FAN 1815
 1145 FORMAT (1H ,75HERROR IN PARAMETER CARD-THE NUMBER OF VARIABLES MAYFAN 1820
     1 NOT BE ZERO OR NEGATIVE)                                          FAN 1825
      GO TO 1215                                                         FAN 1830
 1150 WRITE (IPRI,1155)                                                  FAN 1835
 1155 FORMAT (1H ,62HERROR IN PARAMETER CARD-THE MAXIMUM NUMBER OF VARIAFAN 1840
     1BLES IS 120)                                                       FAN 1845
      GO TO 1215                                                         FAN 1850
 1160 WRITE (IPRI,1165)                                                  FAN 1855
 1165 FORMAT (1H ,73HERROR IN PARAMETER CARD-THE NUMBER OF FACTORS MAY NFAN 1860
     1OT BE ZERO OR NEGATIVE)                                            FAN 1865
      GO TO 1215                                                         FAN 1870
 1170 WRITE (IPRI,1175)                                                  FAN 1875
 1175 FORMAT (1H ,60HERROR IN PARAMETER CARD-THE MAXIMUM NUMBER OF FACTOFAN 1880
     1RS IS 120)                                                         FAN 1885
      GO TO 1215                                                         FAN 1890
 1180 WRITE (IPRI,1185)                                                  FAN 1895
 1185 FORMAT (1H ,79HTHE NUMBER OF FACTORS EXTRACTED MAY NOT BE GREATER FAN 1900
     1THAN THE NUMBER OF VARIABLES)                                      FAN 1905
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      GO TO 1215                                                        FAN 1910
 1190 WRITE (IPRI,1195)                                                 FAN 1915
 1195 FORMAT (1H ,27HOVERFLOW ERROR Y(I)-10. POS)                       FAN 1920
      GO TO 1135                                                        FAN 1925
 1200 WRITE (IPRI,1205)                                                 FAN 1930
 1205 FORMAT (1H ,89HERROR IN PARAMETER CARD-VALUE OF VARIANCE (EIGENVALFAN 1935
     1UE) MAY NOT EXCEED SUM OF DIAGONALS.  )                           FAN 1940
      GO TO 1215                                                        FAN 1945
 1215 RETURN                                                            FAN 1950
      END                                                               FAN 1955
      SUBROUTINE VROT(FM,N,M,JUM)                                       VROT   5
C     ***************************************************************VROT  10
C     ************************VARIMAX ROTATION************************VROT  15
C     ***************************************************************VROT  20
      DIMENSION H(120),FM(JUM,JUM)                                      VROT  25
      DIMENSION SUMSQ(60),COMSUM(120),CUMPER(60),SUMQ(120)              VROT  30
      COMMON /TITLE/NO1,NO2, NUM,   NVR,IREA,IPRI,IPUN                  VROT  35
      COMMON /FACTR/NFAN,IVROP,FANPLT,VARPLT,ORJPLT                     VROT  40
      LOGICAL LCARD,ORJPLT,FANPLT,VARPLT                                VROT  45
      COMMON /TLABL/TTLE(20)                                            VROT  50
      WRITE (IPRI,10)                                                   VROT  55
   10 FORMAT (1H1,////////57X,16HVARIMAX ROTATION//)                     VROT  60
      WRITE (IPRI,20)TTLE                                               VROT  65
   20 FORMAT (1H ,25X,20A4//)                                           VROT  70
C     ***************************************************************VROT  75
C     READ OPTIONS FOR VARIMAX ROTATION                                 VROT  80
C     ***************************************************************VROT  85
      READ (IREA,25) IMPRT,INPCH,LZ                                     VROT  90
   25 FORMAT (3I5)                                                      VROT  95
      WRITE (IPRI,30) NO1,NO2,N,LZ                                      VROT 100
   30 FORMAT (1H ,36X,12HPROBLEM NAME,2X,2A4,10X,I3,12H VARIABLES ,,I3,8VROT 105
     1H FACTORS//)                                                      VROT 110
      XN=N                                                              VROT 115
      L = LZ                                                            VROT 120
      IF (N-120)  40,40,840                                             VROT 125
   40 IF (L-60)  45,45,850                                              VROT 130
   45 IF (N)  860,860,50                                                VROT 135
   50 IF (L)  870,870,55                                                VROT 140
   55 IF (N-L)  885,60,60                                               VROT 145
   60 E=.005                                                            VROT 150
      IHO=0                                                             VROT 155
      ICOR=((N-1)/6)+1                                                  VROT 160
      ICORK=((L-1)/6)+1                                                 VROT 165
      IVM=1                                                             VROT 170
      IF (IMPRT)  75,95,75                                              VROT 175
   75 KEY=1                                                             VROT 180
 1000 FORMAT(10F11.5)                                                   VROT 185
      WRITE (IPRI,85)                                                   VROT 190
   85 FORMAT (1H1,47X,38HTHE ORIGINAL MATRIX OF FACTOR LOADINGS/)       VROT 195
      GO TO 545                                                         VROT 200
   95 SQRT2=0.70710678                                                  VROT 205
      IHO=1                                                             VROT 210
      WRITE (IPRI,105)                                                  VROT 215
  105 FORMAT (1H1,59X,13HCOMMUNALITIES/)                                VROT 220
C     ***************************************************************VROT 225
C     NORMALIZE FACTOR MATRIX                                           VROT 230
C     ***************************************************************VROT 235
      DO 145 I=1,N                                                      VROT 240
      SUMH=0.0                                                          VROT 245
      DO 130 J=1,L                                                      VROT 250
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      X=FM(I,J)                                                          VROT 255
  130 SUMH=SUMH+(X*X)                                                    VROT 260
C     ***********************************************************************VROT 265
C     PRINT COMMUNALITIES                                                VROT 270
C     ***********************************************************************VROT 275
      WRITE (IPRI,140) I,SUMH                                            VROT 280
  140 FORMAT (1H ,54X,I6,F12.5)                                          VROT 285
  145 H(I)=SQRT(SUMH)                                                    VROT 290
      DO 160 I=1,N                                                       VROT 295
      DO 160 J=1,L                                                       VROT 300
  160 FM(I,J)=FM(I,J)/H(I)                                               VROT 305
C     ***********************************************************************VROT 310
C     FACTOR MATRIX ROTATION                                             VROT 315
C     ***********************************************************************VROT 320
  165 LL=L-1                                                             VROT 325
      DO 480 J=1,LL                                                      VROT 330
      JJ=J+1                                                             VROT 335
      DO 480 K=JJ,L                                                      VROT 340
      A=0.0                                                              VROT 345
      B=0.0                                                              VROT 350
      C=0.0                                                              VROT 355
      D=0.0                                                              VROT 360
      DO 235 I=1,N                                                       VROT 365
      X=FM(I,J)                                                          VROT 370
      Y=FM(I,K)                                                          VROT 375
      A=A+(X-Y)*(X+Y)                                                    VROT 380
      B=B+2.0*X*Y                                                        VROT 385
      C=C+X*X*X*X-(6.0*X*X*Y*Y)+Y*Y*Y*Y                                  VROT 390
  235 D=D+(4.0*X*X*X*Y)-(4.0*Y*Y*Y*X)                                    VROT 395
      XN=N                                                               VROT 400
      XNUM=D-(2.0*A*B)/XN                                                VROT 405
      DEN=C-(A*A-B*B)/XN                                                 VROT 410
      ANUM=ABS(XNUM)                                                     VROT 415
      ADEN=ABS(DEN)                                                      VROT 420
      IF (ANUM-ADEN)  275,270,300                                        VROT 425
  270 IF (ANUM)  800,470,325                                             VROT 430
  275 TAN4T=ANUM/ADEN                                                    VROT 435
      IF (TAN4T-E)  405,285,285                                          VROT 440
  285 COS4T=1.0/SQRT(1.0+(TAN4T*TAN4T))                                  VROT 445
      SIN4T=TAN4T*COS4T                                                  VROT 450
      GO TO 340                                                          VROT 455
  300 CTN4T=ADEN/ANUM                                                    VROT 460
      IF (CTN4T-E)  425,310,310                                          VROT 465
  310 SIN4T=1.0/SQRT(1.0+(CTN4T*CTN4T))                                  VROT 470
      COS4T=CTN4T*SIN4T                                                  VROT 475
      GO TO 340                                                          VROT 480
  325 TAN4T=1.0                                                          VROT 485
      COS4T=SQRT2                                                        VROT 490
      SIN4T=SQRT2                                                        VROT 495
C     ***********************************************************************VROT 500
C     ANUM=ADEN=0 DO NEXT ROTATION                                       VROT 505
C     ***********************************************************************VROT 510
  340 COS2T=SQRT((1.0+COS4T)/2.0)                                        VROT 515
      SIN2T=SIN4T/(2.0*COS2T)                                            VROT 520
      COST=SQRT((1.0+COS2T)/2.0)                                         VROT 525
      SINT=SIN2T/(2.0*COST)                                              VROT 530
      IF (DEN)  380,380,365                                              VROT 535
  365 COSO=COST                                                          VROT 540
      SINO=SINT                                                          VROT 545
      GO TO 390                                                          VROT 550
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  380 COSO=(SQRT2*COST)+(SQRT2*SINT)                                    VROT 555
      SINO=(SQRT2*COST)-(SQRT2*SINT)                                    VROT 560
  390 IF (XNUM)  395,470,440                                            VROT 565
  395 SINO=0.0-SINO                                                     VROT 570
      GO TO 440                                                         VROT 575
  405 IF (DEN)  410,470,470                                             VROT 580
  410 COSO=SQRT2                                                        VROT 585
      SINO=SQRT2                                                        VROT 590
      GO TO 440                                                         VROT 595
  425 COS4T=0.0                                                         VROT 600
      SIN4T=1.0                                                         VROT 605
      GO TO 340                                                         VROT 610
  440 DO 460 I=1,N                                                      VROT 615
      X=FM(I,J)                                                         VROT 620
      Y=FM(I,K)                                                         VROT 625
      FM(I,J)=X*COSO+Y*SINO                                             VROT 630
  460 FM(I,K)=Y*COSO-X*SINO                                             VROT 635
  465 LTEST=(L*(L-1))/2                                                 VROT 640
  470 LTEST=LTEST-1                                                     VROT 645
      IF (LTEST)  465,490,480                                           VROT 650
  480 CONTINUE                                                          VROT 655
      GO TO 165                                                         VROT 660
C     ***********************************************************************VROT 665
C      DENORMALIZE FACTOR MATRIX                                        VROT 670
C     ***********************************************************************VROT 675
  490 DO 500 I=1,N                                                      VROT 680
      DO 500 J=1,L                                                      VROT 685
  500 FM(I,J)=H(I)*FM(I,J)                                              VROT 690
C     ***********************************************************************VROT 695
C     PRINT MATRIX OF FACTOR LOADINGS (INPUT MATRIX OPTIONAL)           VROT 700
C     ***********************************************************************VROT 705
      KEY=2                                                             VROT 710
      WRITE (IPRI,540)                                                  VROT 715
  540 FORMAT (1H1,47X,37HTHE ROTATED MATRIX OF FACTOR LOADINGS//)       VROT 720
  545 WRITE (IPRI,550)                                                  VROT 725
      IF(KEY.EQ.1) L=M                                                  VROT 730
      IF (KEY.EQ.2) L=LZ                                                VROT 735
      DO 510 J=1,L                                                      VROT 740
      SUM=0.0                                                           VROT 745
      DO 505 I=1,N                                                      VROT 750
  505 SUM=SUM+(FM(I,J))**2                                              VROT 755
      SUMQ(J)=SUM                                                       VROT 760
  510 SUMSQ(J)=(SUM*100.0)/XN                                           VROT 765
      DO 520 I=1,N                                                      VROT 770
      SUM=0.0                                                           VROT 775
      DO 515 J=1,L                                                      VROT 780
  515 SUM=SUM+(FM(I,J))**2                                              VROT 785
  520 COMSUM(I)=SUM                                                     VROT 790
      SUM=0.0                                                           VROT 795
      DO 525 I=1,L                                                      VROT 800
      SUM=SUM+SUMSQ(I)                                                  VROT 805
  525 CUMPER(I)=SUM                                                     VROT 810
      IHO=1                                                             VROT 815
  550 FORMAT (5X,110H        F  1        F  2        F  3        F  4   VROT 820
     1F  5        F  6        F  7        F  8        F  9        F 10/)VROT 825
      MASS=1                                                            VROT 830
      IF (L-10)  760,560,560                                            VROT 835
  560 DO 565 I=1,N                                                      VROT 840
  565 WRITE (IPRI,750) I,(FM(I,J),J=1,10)                               VROT 845
      IF (IHO-1)  575,570,575                                           VROT 850
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570 WRITE (IPRI,790) (SUMQ(J),J=1,10)                                    VROT 855
    WRITE (IPRI,785) (SUMSQ(J),J=1,10)                                   VROT 860
    WRITE (IPRI,780) (CUMPER(J),J=1,10)                                  VROT 865
575 IF (L-10)  795,795,580                                               VROT 870
580 WRITE (IPRI,585)                                                     VROT 875
585 FORMAT (1H1,4X,110H        F 11        F 12        F 13        F 14  VROT 880
   1    F 15        F 16        F 17        F 18        F 19        F 20/) VROT 885
    MASS=11                                                              VROT 890
    IF (L-20)  760,595,595                                               VROT 895
595 DO 600 I=1,N                                                         VROT 900
600 WRITE (IPRI,750) I,(FM(I,J),J=11,20)                                 VROT 905
    IF (IHO-1)  610,605,610                                              VROT 910
605 WRITE (IPRI,790) (SUMQ(J),J=11,20)                                   VROT 915
    WRITE (IPRI,785) (SUMSQ(J),J=11,20)                                  VROT 920
    WRITE (IPRI,780) (CUMPER(J),J=11,20)                                 VROT 925
610 IF (L-20)  795,795,615                                               VROT 930
615 WRITE (IPRI,620)                                                     VROT 935
620 FORMAT (1H1,4X,110H        F 21        F 22        F 23        F 24  VROT 940
   1    F 25        F 26        F 27        F 28        F 29        F 30/) VROT 945
    MASS=21                                                              VROT 950
    IF (L-30)  760,630,630                                               VROT 955
630 DO 635 I=1,N                                                         VROT 960
635 WRITE (IPRI,750) I,(FM(I,J),J=21,30)                                 VROT 965
    IF (IHO-1)  645,640,645                                              VROT 970
640 WRITE (IPRI,790) (SUMQ(J),J=21,30)                                   VROT 975
    WRITE (IPRI,785) (SUMSQ(J),J=21,30)                                  VROT 980
    WRITE (IPRI,780) (CUMPER(J),J=21,30)                                 VROT 985
645 IF (L-30)  795,795,650                                               VROT 990
650 WRITE (IPRI,655)                                                     VROT 995
655 FORMAT (1H1,4X,110H        F 31        F 32        F 33        F 34  VROT1000
   1    F 35        F 36        F 37        F 38        F 39        F 40/) VROT1005
    MASS=31                                                              VROT1010
    IF (L-40)  760,665,665                                               VROT1015
665 DO 670 I=1,N                                                         VROT1020
670 WRITE (IPRI,750) I,(FM(I,J),J=31,40)                                 VROT1025
    IF (IHO-1)  680,675,680                                              VROT1030
675 WRITE (IPRI,790) (SUMQ(J),J=31,40)                                   VROT1035
    WRITE (IPRI,785) (SUMSQ(J),J=31,40)                                  VROT1040
    WRITE (IPRI,780) (CUMPER(J),J=31,40)                                 VROT1045
680 IF (L-40)  795,795,685                                               VROT1050
685 WRITE (IPRI,690)                                                     VROT1055
690 FORMAT (1H1,4X,110H        F 41        F 42        F 43        F 44  VROT1060
   1    F 45        F 46        F 47        F 48        F 49        F 50/) VROT1065
    MASS=41                                                              VROT1070
    IF (L-50)  760,700,700                                               VROT1075
700 DO 705 I=1,N                                                         VROT1080
705 WRITE (IPRI,750) I,(FM(I,J),J=41,50)                                 VROT1085
    IF (IHO-1)  715,710,715                                              VROT1090
710 WRITE (IPRI,790) (SUMQ(J),J=41,50)                                   VROT1095
    WRITE (IPRI,785) (SUMSQ(J),J=41,50)                                  VROT1100
    WRITE (IPRI,780) (CUMPER(J),J=41,50)                                 VROT1105
715 IF (L-50)  795,795,720                                               VROT1110
720 WRITE (IPRI,725)                                                     VROT1115
725 FORMAT (1H1,4X,110H        F 51        F 52        F 53        F 54  VROT1120
   1    F 55        F 56        F 57        F 58        F 59        F 60/) VROT1125
    MASS=51                                                              VROT1130
    IF (L-60)  760,735,735                                               VROT1135
735 DO 740 I=1,N                                                         VROT1140
740 WRITE (IPRI,750) I,(FM(I,J),J=51,60)                                 VROT1145
    IF (IHO-1)  755,745,755                                              VROT1150
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  745 WRITE (IPRI,790) (SUMQ(J),J=51,60)                                VROT1155
      WRITE (IPRI,785) (SUMSQ(J),J=51,60)                               VROT1160
      WRITE (IPRI,780) (CUMPER(J),J=51,60)                              VROT1165
  750 FORMAT (1H ,I3,3X,10F11.5)                                        VROT1170
  755 CONTINUE                                                          VROT1175
      GO TO 795                                                         VROT1180
  760 DO 765 I=1,N                                                      VROT1185
  765 WRITE (IPRI,775) I,(FM(I,J),J=MASS,L)                             VROT1190
      IF (IHO-1)  795,770,795                                           VROT1195
  770 WRITE (IPRI,790) (SUMQ(J),J=MASS,L)                               VROT1200
      WRITE (IPRI,785) (SUMSQ(J),J=MASS,L)                              VROT1205
      WRITE (IPRI,780) (CUMPER(J),J=MASS,L)                             VROT1210
  775 FORMAT (1H ,I3,3X,9F11.5)                                         VROT1215
  785 FORMAT(1H ,/,6HVAREXP,10F11.5)                                    VROT1225
  780 FORMAT(1H ,/,6HCUMPER,10F11.5)                                    VROT1220
  790 FORMAT(1H , /,6HSUM SQ,10F11.5)                                   VROT1230
  795 IF (KEY-1)  95,95,800                                             VROT1235
C     ***************************************************************VROT1240
C     PUNCH MATRIX OF VARIABLES (OPTIONAL)                              VROT1245
C     ***************************************************************VROT1250
  800 WRITE (IPRI,105)                                                  VROT1255
      WRITE (IPRI,140) (I,COMSUM(I),I=1,N)                              VROT1260
      IF(VARPLT) GO TO 1005                                             VROT1265
      GO TO 801                                                         VROT1270
 1005 READ(IREA,2003) NMAP                                              VROT1275
 2003 FORMAT(I5)                                                        VROT1280
      XMAX = 1.0                                                        VROT1285
      XMIN = -1.0                                                       VROT1290
      YMAX = 1.0                                                        VROT1295
      YMIN = -1.0                                                       VROT1300
      XINT = .0333                                                      VROT1305
      DO 2005 MAP=1,NMAP                                                VROT1310
      READ(IREA,2006) NF1,NF2                                           VROT1315
      WRITE(IPRI,9999)                                                  VROT1320
 9999 FORMAT(1H1)                                                       VROT1325
      WRITE(IPRI,3006)NF1,NF2                                           VROT1330
 3006 FORMAT(45X,30HSCATTERGRAM OF ROTATED FACTORS,/,50X,6HFACTOR,I4,2X,VROT1335
     13HVS.,I4,//)                                                      VROT1340
 2005 CALL PLOT(FM,XMAX,XMIN,YMAX,YMIN,XINT,N,NF1,NF2,JUM)              VROT1345
 2006 FORMAT(2I5)                                                       VROT1350
  801 IF(INPCH) 805,835,805                                             VROT1355
  805 DO 830 J=1,N                                                      VROT1360
      IVM=1                                                             VROT1365
      DO 825 JIM=1,ICORK                                                VROT1370
      IEND=IVM+5                                                        VROT1375
      IF (IEND-L)  815,815,810                                          VROT1380
  810 IEND=L                                                            VROT1385
  815 WRITE (IPUN,820) J,JIM,(FM(J,I),I=IVM,IEND)                       VROT1390
  820 FORMAT (4HVAR.,I3,2HCD,I3,6F10.5)                                 VROT1395
  825 IVM=IVM+6                                                         VROT1400
  830 CONTINUE                                                          VROT1405
  835 RETURN                                                            VROT1410
C     ***************************************************************VROT1415
C     ERROR MESSAGES CAUSED BY MISTAKES IN INPUT                        VROT1420
C     ***************************************************************VROT1425
  840 WRITE (IPRI,845)                                                  VROT1430
  845 FORMAT (1H ,62HERROR IN PARAMETER CARD-THE MAXIMUM NUMBER OF VARIAVROT1435
     1BLES IS 120)                                                      VROT1440
      GO TO 890                                                         VROT1445
  850 WRITE (IPRI,855)                                                  VROT1450
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  855 FORMAT (1H ,59HERROR IN PARAMETER CARD-THE MAXIMUM NUMBER OF FACTOVROT1455
     1RS IS 60)                                                        VROT1460
      GO TO 890                                                        VROT1465
  860 WRITE (IPRI,865)                                                 VROT1470
  865 FORMAT (1H ,75HERROR IN PARAMETER CARD-THE NUMBER OF VARIABLES MAYVROT1475
     1 NOT BE ZERO OR NEGATIVE)                                        VROT1480
      GO TO 890                                                        VROT1485
  870 WRITE (IPRI,875)                                                 VROT1490
  875 FORMAT (1H ,73HERROR IN PARAMETER CARD-THE NUMBER OF FACTORS MAY NVROT1495
     1OT BE ZERO OR NEGATIVE)                                          VROT1500
  880 FORMAT (1H ,69HTHE NUMBER OF FACTORS MAY NOT BE GREATER THAN THE NVROT1505
     1UMBER OF VARIABLES)                                              VROT1510
      GO TO 890                                                        VROT1515
  885 WRITE (IPRI,880)                                                 VROT1520
  890 RETURN                                                           VROT1525
      END                                                              VROT1530
      SUBROUTINE PLOT(X,  XMAX,XMIN,YMAX,YMIN,XINT,NPOINT,I1,I2,JUM)    PLOT   5
C           TWO DIMENSIONAL  PLOTTING                                  PLOT  10
      INTEGER BLNK,STAR,PLUS                                           PLOT  15
      DIMENSION X(JUM,JUM),      NUM(9),YS(11)                         PLOT  20
      DIMENSION MAP(100)                                               PLOT  25
      COMMON /TITLE/NO1,NO2, MUM,   NVR,IREA,IPRI,IPUN                 PLOT  30
      DATA  BLNK/1H /,STAR/1H*/,LINE/1HI/, NUM/1H1,1H2,1H3,1H4,1H5,1H6,1PLOT  35
     1H7,1H8,1H9/                                                      PLOT  40
      DATA MINUS/1H-/,PLUS/1H+/                                        PLOT  45
      YD=100./(YMAX-YMIN)                                              PLOT  50
      NX=(XMAX-XMIN)/XINT+1.                                           PLOT  55
      DO 110 I= 1,11                                                   PLOT  60
  110 YS(I) =YMIN+10.*FLOAT(I-1)/YD                                    PLOT  65
      WRITE(IPRI,1007) I1                                              PLOT  70
 1007 FORMAT(1X, 8HVARIABLE,I3)                                        PLOT  75
      WRITE(IPRI,1005) (YS(I),I=1,11)                                  PLOT  80
 1005 FORMAT(17X,11(F6.2,4X))                                          PLOT  85
      DO 120 LIN=1,100                                                 PLOT  90
  120 MAP(LIN)=MINUS                                                   PLOT  95
      DO 130 LIN=1,100,10                                              PLOT 100
  130 MAP(LIN)=PLUS                                                    PLOT 105
      WRITE(IPRI,1001)(MAP(I),I=1,100)                                 PLOT 110
      DO 11 I=1,NX                                                     PLOT 115
      XX=XMIN+FLOAT(I-1)*XINT                                          PLOT 120
      DO 12 J=1,100                                                    PLOT 125
   12 MAP(J)=0                                                         PLOT 130
      MAP(1)=LINE                                                      PLOT 135
      MAP(100)=LINE                                                    PLOT 140
      DO 13 J=1,NPOINT                                                 PLOT 145
      XNX = XX+ XINT                                                   PLOT 150
  299 IF(X(J,I1).GE.XX.AND. X(J,I1).LT.XNX) GO TO 300                  PLOT 155
      GO TO 13                                                         PLOT 160
  300 NSP=(X(J,I2)-YMIN)*YD+1.49999999                                 PLOT 165
  301 IF(NSP.GT.100)NSP=100                                            PLOT 170
      IF(NSP.LT.1)NSP=1                                                PLOT 175
      MAP(NSP)=MAP(NSP)+1                                              PLOT 180
   13 CONTINUE                                                         PLOT 185
      DO 17 NSP=1,100                                                  PLOT 190
      IF(MAP(NSP).GT.9)MAP(NSP)=STAR                                   PLOT 195
      IF(MAP(NSP).EQ.0)MAP(NSP)=BLNK                                   PLOT 200
      DO 16 K=1,9                                                      PLOT 205
      IF(MAP(NSP).EQ.K)MAP(NSP)=NUM(K)                                 PLOT 210
   16 CONTINUE                                                         PLOT 215
   17 CONTINUE                                                         PLOT 220
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```
  11 WRITE(IPRI,1000)XX,(MAP(J),J=1,100)                                PLOT 225
     DO 140 LIN=1,100                                                   PLOT 230
 140 MAP(LIN)=MINUS                                                     PLOT 235
     DO 150 LIN=1,100,10                                                PLOT 240
 150 MAP(LIN)=PLUS                                                      PLOT 245
     WRITE(IPRI,1001)(MAP(I),I=1,100)                                   PLOT 250
     WRITE(IPRI,1005) (YS(I),I=1,11)                                    PLOT 255
     WRITE(IPRI,1008) I2                                                PLOT 260
1008 FORMAT(60X,8HVARIABLE,I3)                                          PLOT 265
1000 FORMAT(1X,F12.4,7X,100A1)                                          PLOT 270
1001 FORMAT(20X,100A1)                                                  PLOT 275
     RETURN                                                             PLOT 280
     END                                                                PLOT 285
```

```
    2
   11   11    OCORLENVT      1    1    1TTT
(2X,11F7.0,L1)
          ALKALI-THOLEIITIC BASALT PROBLEM - HAMBURGER STAND OPTION
42 50.25   2.12  19.03   4.53   5.50    .22   3.11   5.98   5.30   2.20   1.14
 2 45.74   4.16  16.76   9.39   2.83    .21   3.24   9.02   2.73   2.24    .61
39 49.73   3.05  16.39   7.58   3.98    .23   4.06   7.17   4.12   1.93    .84
41 49.79   2.51  18.37   6.03   4.82    .22   4.01   6.68   4.58   2.08    .56
20 47.99   2.62  19.36   5.83   5.17    .21   4.39   6.54   4.58   1.82    .63
14 45.94   3.00  17.04   7.81   3.28    .25   3.67  10.14   2.63   1.94    .55
13 46.52   2.78  16.00   5.56   4.20    .23   6.09  10.40   2.45   2.45    .50
 7 45.10   0.70  19.05   5.37   5.73    .22   6.03   7.06   2.85   1.90    .66
11 47.20   3.85  16.22   5.20   6.95    .18   4.77   8.49   2.93   2.00    .74
38 50.92   2.55  17.59   3.80   6.69    .20   3.90   6.97   4.28   1.86    .40
40 50.09   2.47  19.49    .73   8.47    .15   4.33   6.92   4.82   1.93    .78
86 47.03   1.92  16.22   5.53   6.07    .10   4.00   8.08   4.50   1.54    .24
15 46.68   4.20  15.01   6.35   5.44    .10   4.30   9.84   3.13   1.51    .47
12 48.65   3.80  17.43   2.80   7.12    .17   4.14   9.72   2.98   2.13    .52
 3 45.24   3.22  16.17   4.52   6.86    .19   7.01   9.76   2.75   1.95    .48
10 43.04   4.00  18.26   2.91   7.82    .20   4.95   9.80   3.62   1.67    .55
85 46.42   1.58  15.28   2.22   5.93    .17   7.06  11.48   3.49   1.61    .78
37 48.42   3.25  13.97   4.17   9.57    .17   4.61   8.86   3.30   1.29    .91
16 43.58   3.30  12.49   8.41   4.92    .19  10.33   9.34   1.91   1.10    .24
 1 46.51   2.98  15.48   3.41   8.68    .17   8.17   8.85   3.00   1.22    .59
 5 42.60   3.79  15.89   2.86   8.34    .18   8.45   9.88   2.30   1.67    .44
70 45.60   3.19  15.89   5.98   7.54    .17   6.56   9.49   2.95    .70    .40
34 47.72   2.48  16.19   3.82   8.25    .08   5.68  11.20   2.80    .84    .43
 9 43.75   4.25  16.92   1.82   9.30    .18   6.70  10.82   2.29   1.18    .39
19 46.49   3.09  17.07   5.35   7.84    .17   4.80  10.52   2.61    .52    .35
 6 46.05   2.65  17.03   3.90   7.47    .32   6.30  11.24   2.60   1.07    .00
32 46.43   3.03  15.22   3.97   8.19    .10   8.40  10.37   2.55    .99    .33
35 47.32   3.09  16.68   2.63   8.67    .16   5.43  11.27   3.08    .79    .53
50 50.04   2.22  15.36   5.39   5.78    .17   7.32  10.17   2.02    .33    .31
 8 45.25   4.00  17.06   2.30   8.42    .18   7.55  11.08   2.05   1.03    .27
36 47.19   2.27  10.95   3.31  10.21    .16  10.52   9.73   4.69    .93    .55
44 47.42   3.46  14.35   3.41  10.33    .18   5.57   9.80   2.95    .69    .43
31 46.65   3.22  14.72   3.63   8.98    .18   7.96  10.14   2.53    .80    .33
79 51.24   3.74  13.60   1.87  11.19    .18   5.12   9.03   2.81    .83    .41
29 41.83   3.16  14.32   4.81   8.98    .19   9.42   8.83   1.83    .77    .29
53 48.55   2.83  14.29   4.89   8.04    .18   6.42  10.76   2.15    .55    .28
54 48.17   2.44  14.46   5.58   6.05    .18   6.99  11.03   1.88    .29    .20
64 49.50   2.10  15.38   4.51   6.99    .17   7.23  10.44   2.10    .39    .28
66 46.91   2.44  15.23   5.54   6.18    .17   7.38  10.90   1.85    .19    .20
33 47.79   1.90  14.80   2.63  10.04    .14   6.89  11.31   2.56    .94    .26
68 50.02   2.23  15.05   3.77   7.37    .17   7.01  10.17   2.05    .33    .27
73 49.86   2.43  15.11   3.66   7.82    .17   6.00  10.34   2.05    .26    .27
72 48.29   2.56  15.54   3.27   7.88    .17   7.70  10.21   2.17    .28    .27
46 50.40   3.26  13.91   1.80  10.09    .18   6.57  10.65   2.52    .69    .30
27 45.77   2.47  13.16   2.97   9.27    .17  11.64  10.23   1.88    .29    .24
30 45.14   3.04  13.49   3.60   9.27    .18  10.02  10.60   2.24    .80    .26
48 49.42   2.42  11.83   3.83   8.08    .14  12.04   9.28   2.35    .59    .39
60 49.69   2.60  15.26   3.16   8.35    .16   6.50  10.78   2.20    .37    .25
 4 43.96   2.36  11.06   5.29   6.37    .19  12.88  11.88   1.26    .57    .32
77 50.20   2.15  14.72   3.38   7.79    .17   7.88   9.81   2.00    .36    .27
76 50.20   2.40  14.93   3.64   7.67    .17   7.15  10.16   2.05    .30    .27
55 48.24   3.09  14.48   3.58  10.42    .20   6.05  10.02   2.00    .48    .30
51 50.80   1.93  15.25   2.91   7.23    .16   8.27   9.83   2.15    .28    .25
69 48.84   2.58  14.59   2.78   8.45    .17   7.25  10.90   2.15    .42    .33
75 49.67   2.33  15.08   2.86   8.57    .16   6.76  10.51   2.06    .32    .26
45 47.12   2.34  14.51   4.39   7.21    .18  10.74  10.36   1.94    .25    .25
17 46.39   2.13  12.94   2.05  10.16    .17  11.38  10.81   2.43    .93    .32
84 48.57   2.61  13.34   2.95   8.66    .17  10.41  10.26   2.02    .50    .26
28 46.31   3.10  14.83   4.06   9.26    .19   6.77  11.30   2.25    .20    .25
78 47.25   2.16  14.70   3.91   7.27    .16  10.46  10.22   1.86    .24    .25
59 47.10   2.31  16.05   3.12   8.27    .19   7.12  11.91   2.00    .19    .26
81 50.87   2.86  13.94   1.85   9.07    .17   7.35  11.09   2.34    .49    .25
47 49.37   2.50  14.73   1.71   9.39    .16   6.87  10.86   2.05    .40    .27
71 51.77   4.01  13.54    .75   9.63    .15   7.33  10.57   2.18    .45    .26
26 46.43   2.29  14.00   3.34   8.17    .17  11.41  11.86   1.69    .49    .25
58 50.07   2.70  13.32   1.92   9.28    .16   8.01  10.64   2.16    .45    .26
57 50.32   3.10  12.83   1.74   9.93    .10   7.39  11.06   2.38    .41    .30
82 50.68   2.54  13.55   1.39   9.35    .17   8.47  10.98   2.24    .45    .26
74 49.07   2.48  14.62   2.00   9.52    .17   7.80  10.38   2.01    .31    .28
65 47.14   2.88  14.57   2.09  10.85    .19   8.35  10.09   2.03    .33    .31
43 46.19   2.15  12.02   4.08   8.19    .17  12.75  10.73   1.79    .38    .20
83 50.24   2.92  13.46   1.17  10.94    .18   7.04  10.30   2.40    .52    .17
61 50.88   2.59  13.75    .73  10.42    .20   7.77  10.76   2.00    .52    .24
62 50.03   2.57  12.10   2.10   9.97    .16   9.57  10.58   2.01    .44    .21
49 50.37   2.33  14.20   1.28  10.10    .14   7.75  11.24   2.20    .56    .02
52 50.46   2.14  12.75    .82  10.68    .18   9.68  10.43   2.42    .51    .19
25 45.64   2.34  10.61   3.02   9.02    .18  14.32  10.88   1.62    .46    .25
22 44.24   2.34  11.01   3.36   8.97    .19  14.67  10.36   1.32    .30    .25
24 46.60   2.15  11.21   2.04   9.61    .17  15.01  10.60   1.52    .56    .18
18 45.30   1.85  10.11   3.75   8.91    .18  17.87   8.96   1.35    .30    .20
23 46.57   1.67   7.81   2.40   8.91    .13  19.74  10.65   1.70    .33    .34
21 46.01   1.61   7.96   2.54   9.09    .18  20.19  10.49   1.26    .27    .17
63 46.50   1.70   9.37   2.47  10.79    .11  21.00   6.25   1.52    .22    .10
67 46.68   1.91  13.15   4.71   7.62    .17  11.12   9.68   2.15    .49    .22 T
    6
    1  52.       41.          3   20.       7.        0.25
    1    52.     41.          9       6.      1.       0.25
    1    52.     41.         10  2.5        0.0       0.25
    6   .35      .05          7   22.       2.        .01
    5  12.       2.           7   22.       2.0       .2
    9   6.       1.          10  2.5         0.0      .12
    5            5555
    3
    1    2
    1    3
    2    3
    1         3
    3
    1    2
    1    3
    2    3
```

```
   11   11    OQMODFNVT      1    1     TTT
(2X,11F7.0,L1)
      THOLEIITIC - ALKALIC BASALT PROBLEM   Q-MODE FACTOR ANALYSIS
42 50.25   2.12  19.03   4.53   5.50   .22   3.11   5.98   5.30   2.20   1.14
 2 45.74   4.16  16.76   9.39   2.83   .21   3.24   9.02   2.73   2.24   .61
39 49.73   3.05  16.39   7.58   3.98   .23   4.06   7.17   4.12   1.93   .84
41 49.79   2.51  18.37   6.03   4.82   .22   4.01   6.68   4.58   2.08   .56
20 47.99   2.62  19.36   5.83   5.17   .21   4.39   6.54   4.58   1.82   .63
14 45.94   3.00  17.04   7.81   3.28   .25   3.67  10.14   2.63   1.94   .55
13 46.52   2.78  16.00   5.56   4.20   .23   6.09  10.40   2.45   2.45   .50
 7 45.10   0.70  19.05   5.37   5.73   .22   6.03   7.06   2.85   1.90   .66
11 47.20   3.85  16.22   5.20   6.95   .18   4.77   8.49   2.93   2.00   .74
38 50.92   2.55  17.59   3.80   6.69   .20   3.90   6.97   4.28   1.86   .40
40 50.09   2.47  19.49    .73   8.47   .15   4.33   6.92   4.82   1.93   .78
86 47.03   1.92  16.22   5.53   6.07   .10   4.00   8.08   4.50   1.54   .24
15 46.68   4.20  15.01   6.35   5.44   .10   4.30   9.84   3.13   1.51   .47
12 48.65   3.80  17.43   2.80   7.12   .17   4.14   9.72   2.98   2.13   .52
 3 45.24   3.22  16.17   4.52   6.86   .19   7.01   9.76   2.75   1.95   .48
10 43.04   4.00  18.26   2.91   7.82   .20   4.95   9.80   3.62   1.67   .55
85 46.42   1.58  15.28   2.22   5.93   .17   7.06  11.48   3.49   1.61   .78
37 48.42   3.25  13.97   4.17   9.57   .17   4.61   8.86   3.30   1.29   .91
16 43.58   3.30  12.49   8.41   4.92   .19  10.33   9.34   1.91   1.10   .24
 1 46.51   2.98  15.48   3.41   8.68   .17   8.17   8.85   3.00   1.22   .59
 5 42.60   3.79  15.89   2.86   8.34   .18   8.45   9.88   2.30   1.67   .44
70 45.60   3.19  15.89   5.98   7.54   .17   6.56   9.49   2.95    .70   .40
34 47.72   2.48  16.19   3.82   8.25   .08   5.68  11.20   2.80    .84   .43
 9 43.75   4.25  16.92   1.82   9.30   .18   6.70  10.82   2.29   1.18   .39
19 46.49   3.09  17.07   5.35   7.84   .17   4.80  10.52   2.61    .52   .35
 6 46.05   2.65  17.03   3.90   7.47   .32   6.30  11.24   2.60   1.07   .00
32 46.43   3.03  15.22   3.97   8.19   .10   8.40  10.37   2.55    .99   .33
35 47.32   3.09  16.68   2.63   8.67   .16   5.43  11.27   3.08    .79   .53
50 50.04   2.22  15.36   5.39   5.78   .17   7.32  10.17   2.02    .33   .31
 8 45.25   4.00  17.06   2.30   8.42   .18   7.55  11.08   2.05   1.03   .27
36 47.19   2.27  10.95   3.31  10.21   .16  10.52   9.73   4.69    .93   .55
44 47.42   3.46  14.35   3.41  10.33   .18   5.57   9.80   2.95    .69   .43
31 46.65   3.22  14.72   3.63   8.98   .18   7.96  10.14   2.53    .80   .33
79 51.24   3.74  13.60   1.87  11.19   .18   5.12   9.03   2.81    .83   .41
29 41.83   3.16  14.32   4.81   8.98   .19   9.42   8.83   1.83    .77   .29
53 48.55   2.83  14.29   4.89   8.04   .18   6.42  10.76   2.15    .55   .28
54 48.17   2.44  14.46   5.58   6.05   .18   6.99  11.03   1.88    .29   .20
64 49.50   2.10  15.38   4.51   6.99   .17   7.23  10.44   2.10    .39   .28
66 46.91   2.44  15.23   5.54   6.18   .17   7.38  10.90   1.85    .19   .20
33 47.79   1.90  14.80   2.63  10.04   .14   6.89  11.31   2.56    .94   .26
68 50.02   2.23  15.05   3.77   7.37   .17   7.01  10.17   2.05    .33   .27
73 49.86   2.43  15.11   3.66   7.82   .17   6.00  10.34   2.05    .26   .27
72 48.29   2.56  15.54   3.27   7.88   .17   7.70  10.21   2.17    .28   .27
46 50.40   3.26  13.91   1.80  10.09   .18   6.57  10.65   2.52    .69   .30
27 45.77   2.47  13.16   2.97   9.27   .17  11.64  10.23   1.88    .29   .24
30 45.14   3.04  13.49   3.60   9.27   .18  10.02  10.60   2.24    .80   .26
48 49.42   2.42  11.83   3.83   8.08   .14  12.04   9.28   2.35    .59   .39
60 49.69   2.60  15.26   3.16   8.35   .16   6.50  10.78   2.20    .37   .25
 4 43.96   2.36  11.06   5.29   6.37   .19  12.88  11.88   1.26    .57   .32
77 50.20   2.15  14.72   3.38   7.79   .17   7.88   9.81   2.00    .36   .27
76 50.20   2.40  14.93   3.64   7.67   .17   7.15  10.16   2.05    .30   .27
55 48.24   3.09  14.48   3.58  10.42   .20   6.05  10.02   2.00    .48   .30
51 50.80   1.93  15.25   2.91   7.23   .16   8.27   9.83   2.15    .28   .25
69 48.84   2.58  14.59   2.78   8.45   .17   7.25  10.90   2.15    .42   .33
75 49.67   2.33  15.08   2.86   8.57   .16   6.76  10.51   2.06    .32   .26
45 47.12   2.34  14.51   4.39   7.21   .18  10.74  10.36   1.94    .25   .25
17 46.39   2.13  12.94   2.05  10.16   .17  11.38  10.81   2.43    .93   .32
84 48.57   2.61  13.34   2.95   8.66   .17  10.41  10.26   2.02    .50   .26
28 46.31   3.10  14.83   4.06   9.26   .19   6.77  11.30   2.25    .20   .25
78 47.25   2.16  14.70   3.91   7.27   .16  10.46  10.22   1.86    .24   .25
59 47.10   2.31  16.05   3.12   8.27   .19   7.12  11.91   2.00    .19   .26
81 50.87   2.86  13.94   1.85   9.07   .17   7.35  11.09   2.34    .49   .25
47 49.37   2.50  14.73   1.71   9.39   .16   6.87  10.86   2.05    .40   .27
71 51.77   4.01  13.54    .75   9.63   .15   7.33  10.57   2.18    .45   .26
26 46.43   2.29  14.00   3.34   8.17   .17  11.41  11.86   1.69    .49   .25
58 50.07   2.70  13.32   1.92   9.28   .16   8.01  10.64   2.16    .45   .26
57 50.32   3.10  12.83   1.74   9.93   .10   7.39  11.06   2.38    .41   .30
82 50.68   2.54  13.55   1.39   9.35   .17   8.47  10.98   2.24    .45   .26
74 49.07   2.48  14.62   2.00   9.52   .17   7.80  10.38   2.01    .31   .28
65 47.14   2.88  14.57   2.09  10.85   .19   8.35  10.09   2.03    .33   .31
43 46.19   2.15  12.02   4.08   8.19   .17  12.75  10.73   1.79    .38   .20
83 50.24   2.92  13.46   1.17  10.94   .18   7.04  10.30   2.40    .52   .17
61 50.88   2.59  13.75    .73  10.42   .20   7.77  10.76   2.00    .52   .24
62 50.03   2.57  12.10   2.10   9.97   .16   9.57  10.58   2.01    .44   .21
49 50.37   2.33  14.20   1.28  10.10   .14   7.75  11.24   2.20    .56   .02
52 50.46   2.14  12.75    .82  10.68   .18   9.68  10.43   2.42    .51   .19
25 45.64   2.34  10.61   3.02   9.02   .18  14.32  10.88   1.62    .46   .25
22 44.24   2.34  11.01   3.36   8.97   .19  14.67  10.36   1.32    .30   .25
24 46.60   2.15  11.21   2.04   9.61   .17  15.01  10.60   1.52    .56   .18
18 45.30   1.85  10.11   3.75   8.91   .18  17.87   8.96   1.35    .30   .20
23 46.57   1.67   7.81   2.40   8.91   .13  19.74  10.65   1.70    .33   .34
21 46.01   1.61   7.96   2.54   9.09   .18  20.19  10.49   1.26    .27   .17
63 46.50   1.70   9.37   2.47  10.79   .11  21.00   6.25   1.52    .22   .10
67 46.68   1.91  13.15   4.71   7.62   .17  11.12   9.68   2.15    .49   .22 T
    6
    1  52.       41.          3   20.      7.       0.25
    1    52.     41.          9       6.     1.      0.25
    1    52.     41.         10  2.5      0.0      0.25
    6   .35      .05          7   22.      2.       .01
    5  12.       2.           7   22.      2.0      .2
    9   6.       1.          10  2.5       0.0      .12
    5            5555
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    1    2
    1    3
    2    3
    1          3
    3
    1    2
    1    3
    2    3
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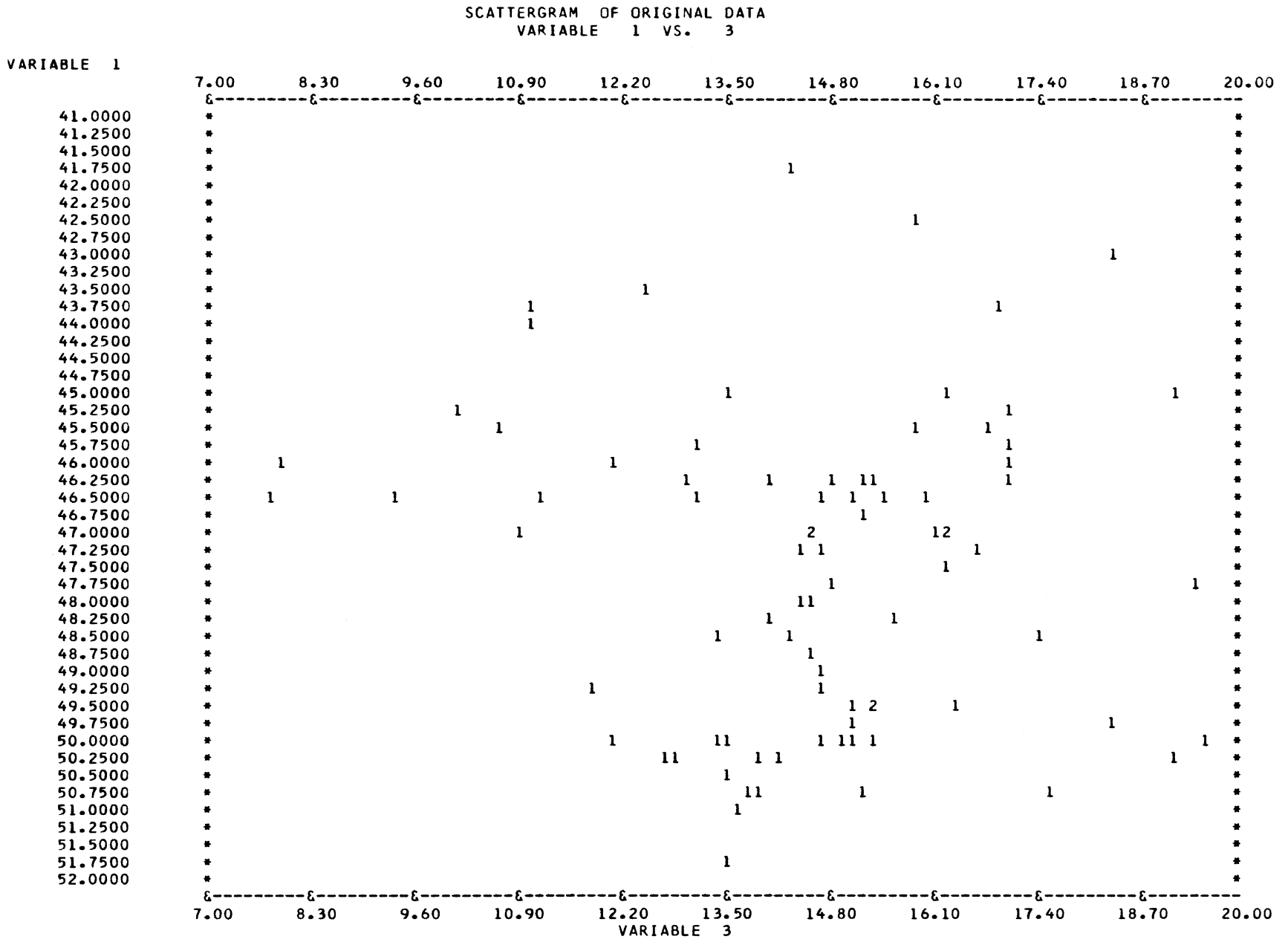
SCATTERGRAM OF ORIGINAL DATA
VARIABLE 1 VS. 3
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51.5000
51.7500
52.0000
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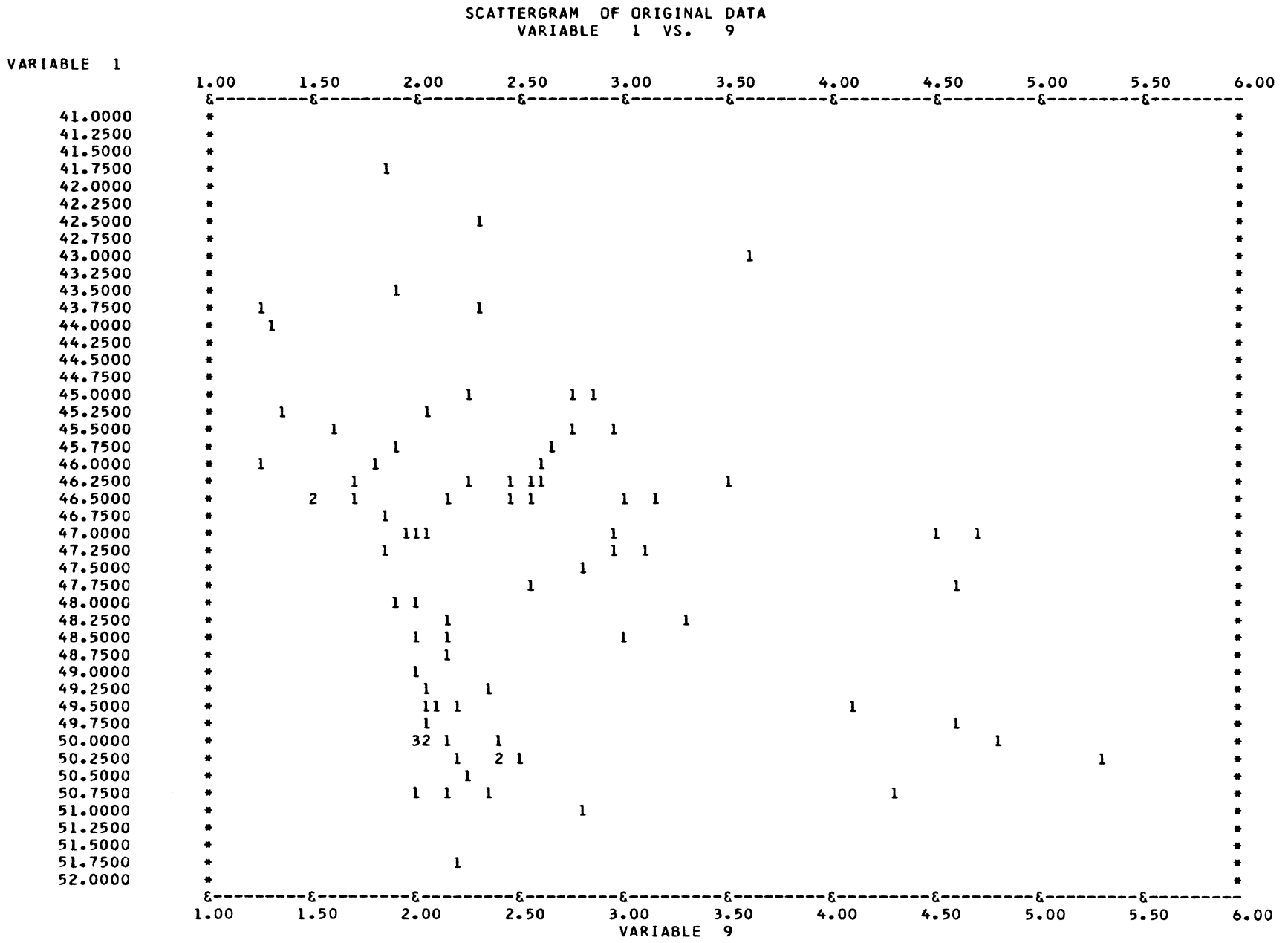
10.90
12.20
13.50
14.80
16.10
17.40
18.70
20.00
VARIABLE 3


SCATTERGRAM OF ORIGINAL DATA
VARIABLE 1 VS. 9
VARIABLE 1
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41.2500
41.5000
41.7500
42.0000
42.2500
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42.7500
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51.0000
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51.5000
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52.0000
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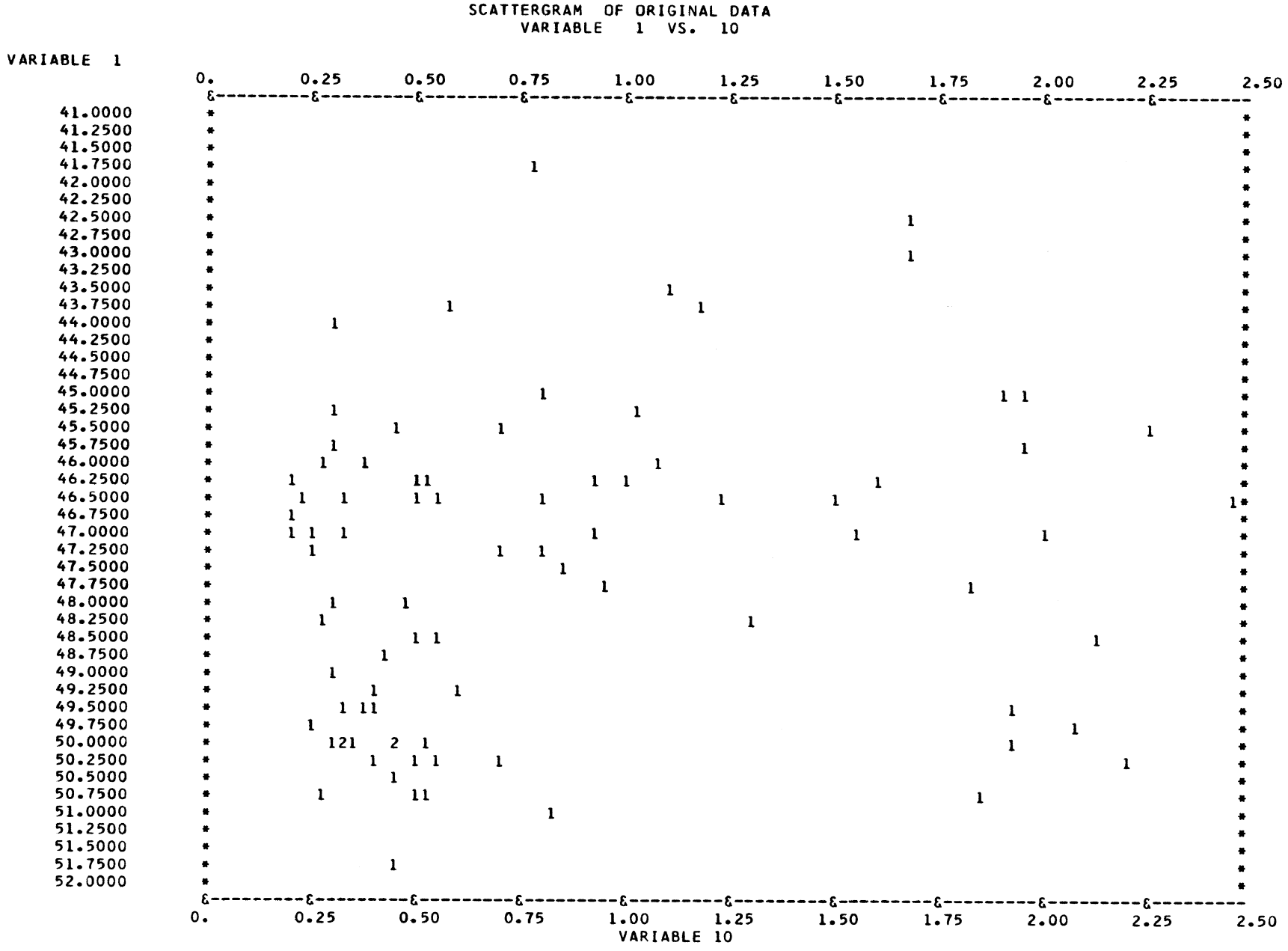
VARIABLE 9


SCATTERGRAM OF ORIGINAL DATA
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52.0000
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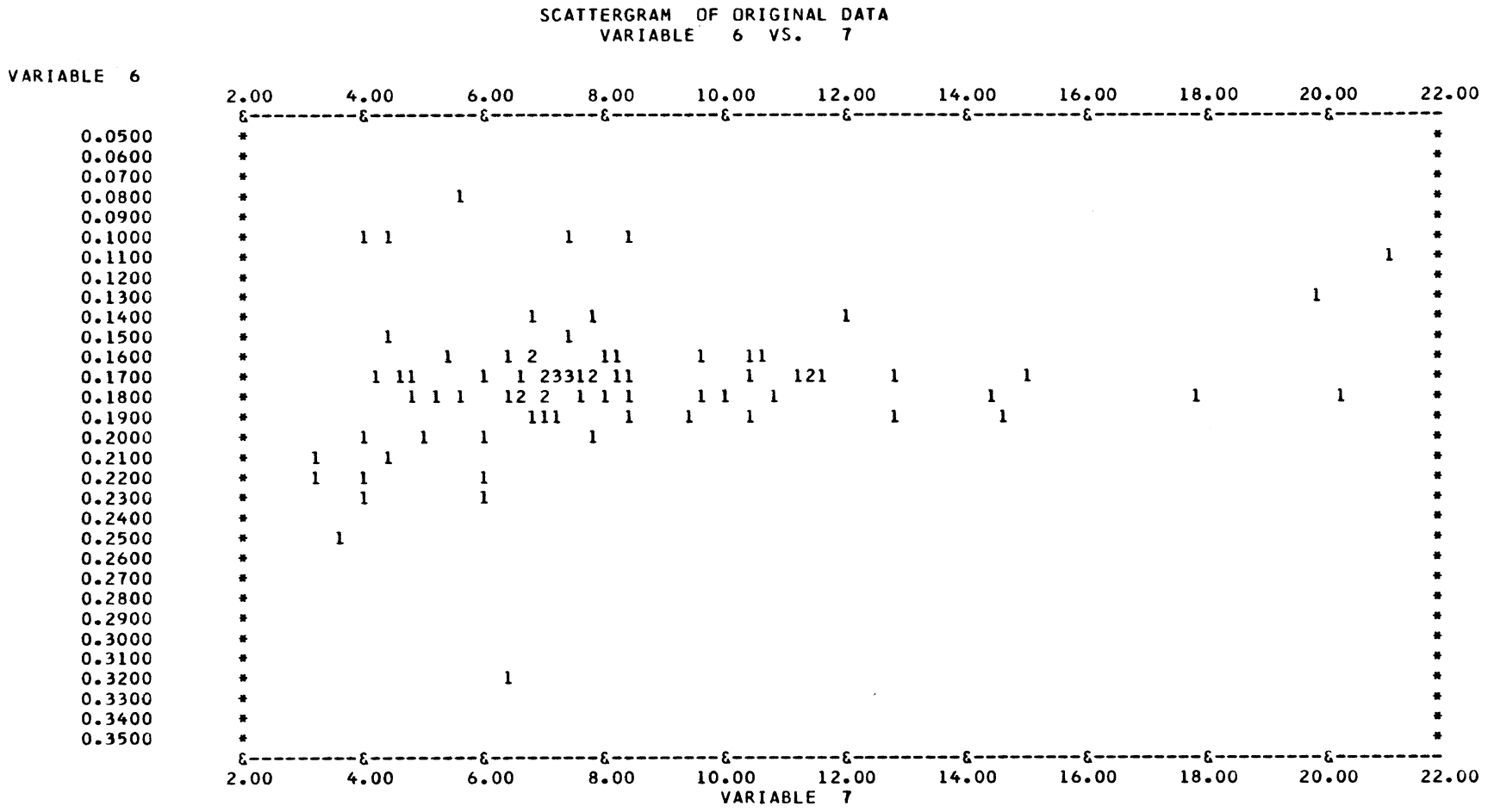
1.50
1.75
2.00
2.25
2.50
VARIABLE 10


SCATTERGRAM OF ORIGINAL DATA
VARIABLE 6 VS. 7
VARIABLE 6
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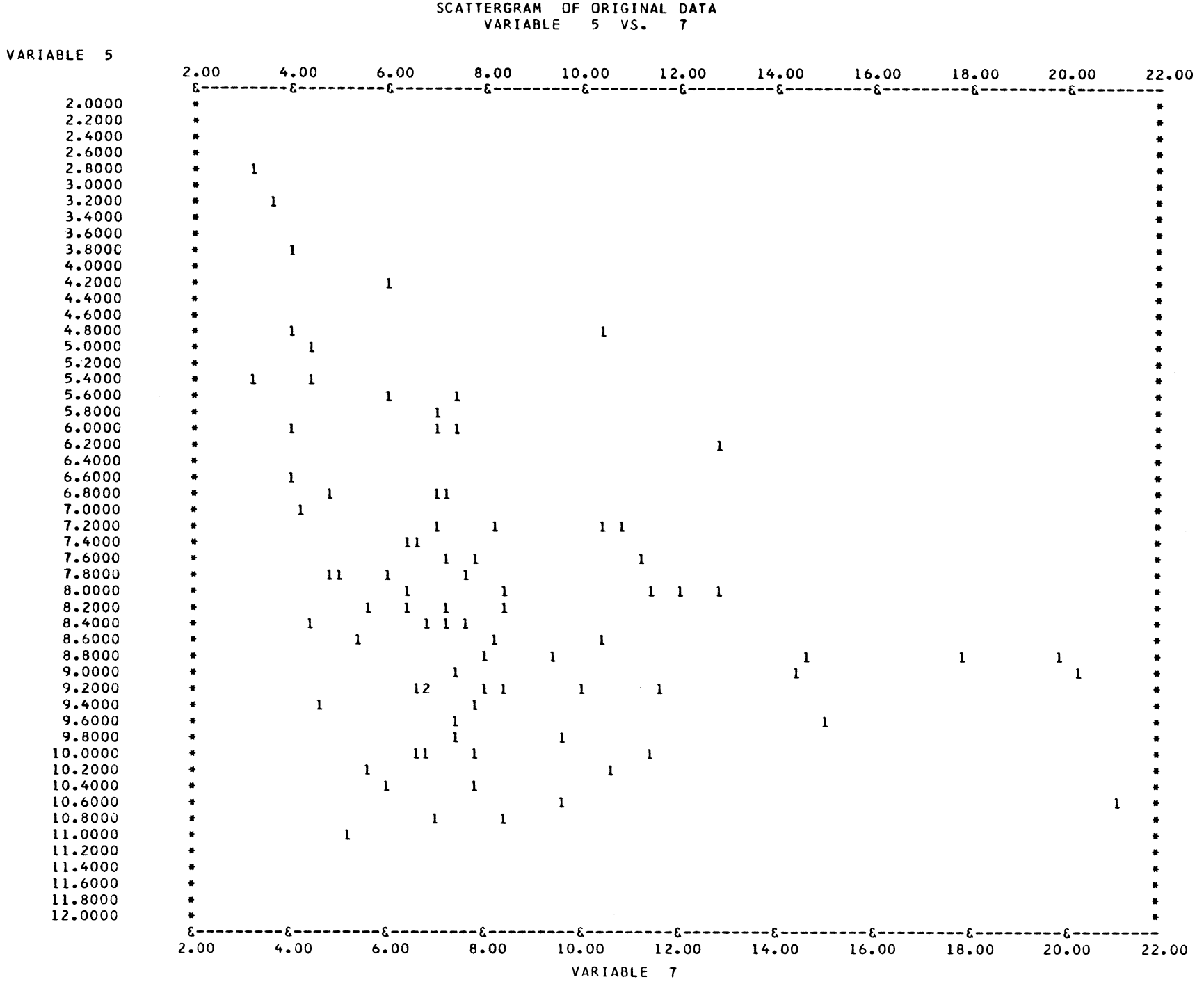
0.0500
0.0600
0.0700
0.0800
0.0900
0.1000
0.1100
0.1200
0.1300
0.1400
0.1500
0.1600
0.1700
0.1800
0.1900
0.2000
0.2100
0.2200
0.2300
0.2400
0.2500
0.2600
0.2700
0.2800
0.2900
0.3000
0.3100
0.3200
0.3300
0.3400
0.3500
2.00 4.00 6.00 8.00 10.00 12.00 14.00 16.00 18.00 20.00 22.00
VARIABLE 7


SCATTERGRAM OF ORIGINAL DATA
VARIABLE 5 VS. 7
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2.6000
2.8000
3.0000
3.2000
3.4000
3.6000
3.8000
4.0000
4.2000
4.4000
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10.6000
10.8000
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11.2000
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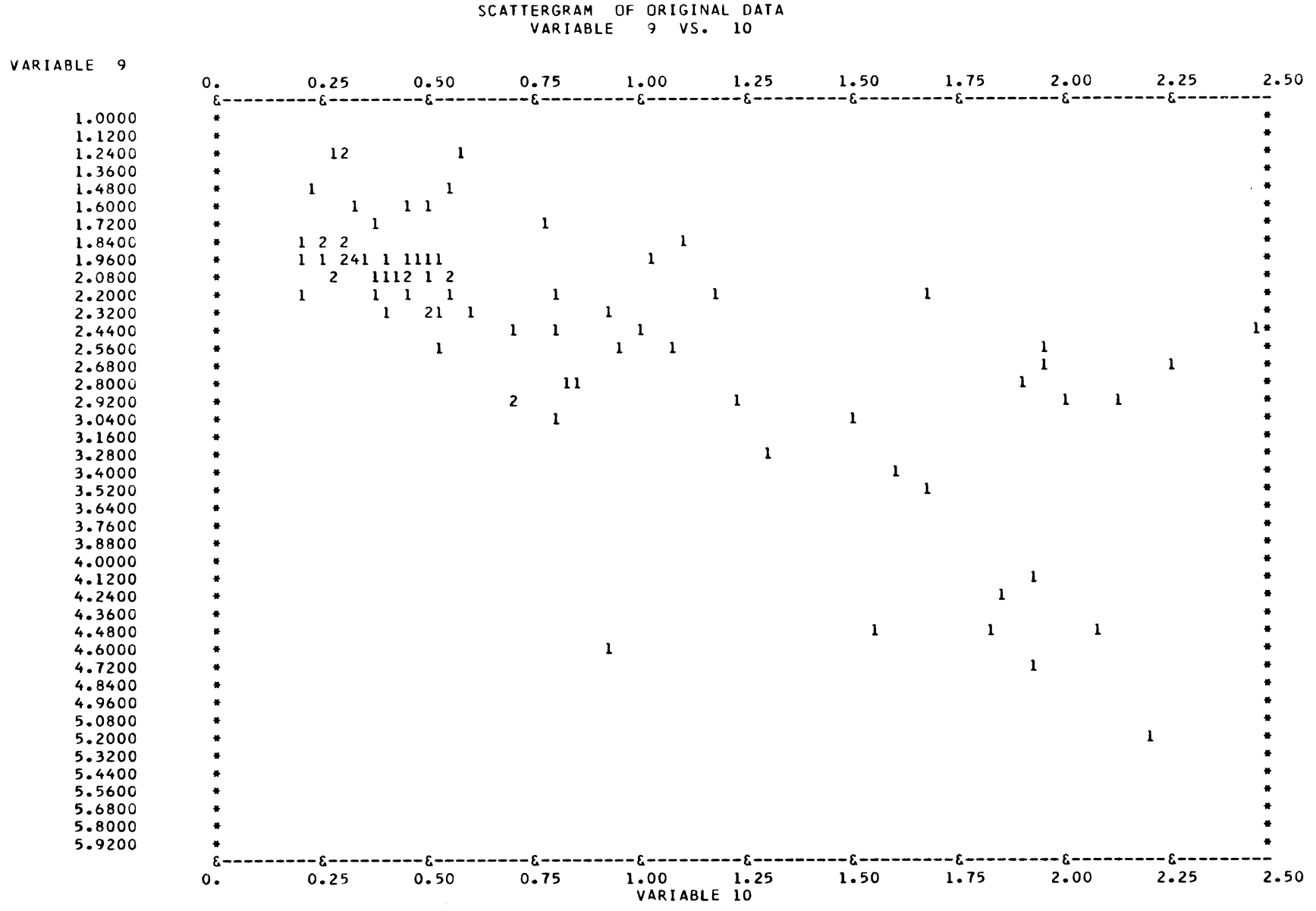
12.0000
2.00 4.00 6.00 8.00 10.00 12.00 14.00 16.00 18.00 20.00 22.00
VARIABLE 7


SCATTERGRAM OF ORIGINAL DATA
VARIABLE 9 VS. 10
VARIABLE 9
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1.0000
1.1200
1.2400
1.3600
1.4800
1.6000
1.7200
1.8400
1.9600
2.0800
2.2000
2.3200
2.4400
2.5600
2.6800
2.8000
2.9200
3.0400
3.1600
3.2800
3.4000
3.5200
3.6400
3.7600
3.8800
4.0000
4.1200
4.2400
4.3600
4.4800
4.6000
4.7200
4.8400
4.9600
5.0800
5.2000
5.3200
5.4400
5.5600
5.6800
5.8000
5.9200
0. 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50
VARIABLE 10

SYMMETRIC CORRELATION MATRIX

NUMBER CASES 84 PROBLEM NAME CORLFNVT

	1	2	3	4	5	6	7	8	9	10
2	-0.146									
3	0.071	0.296								
4	-0.359	0.113	0.286							
5	0.175	-0.015	-0.493	-0.829						
6	-0.165	0.077	0.312	0.298	-0.338					
7	-0.301	-0.454	-0.860	-0.257	0.370	-0.216				
8	-0.065	0.053	-0.334	-0.329	0.322	-0.143	0.175			
9	0.183	0.137	0.619	0.200	-0.329	0.109	-0.614	-0.627		
10	-0.188	0.316	0.611	0.414	-0.580	0.331	-0.520	-0.556	0.718	
11	-0.021	0.200	0.510	0.310	-0.430	0.178	-0.481	-0.553	0.734	0.749

MEANS CORLFNVT

VARIABLES										
1 TO 10	47.691	2.685	14.589	3.602	8.103	0.174	8.154	9.985	2.482	0.835
11 TO 11	0.356									

STANDARD DEVIATIONS

VARIABLES									
1 TO 10	2.247	0.671	2.329	1.738	1.829	0.033	3.695	1.312	0.847	0.629
11 TO 11	0.194									

STATISTICS COMPLETED FOR CORLFNVT

PRINCIPAL COMPONENTS ANALYSIS

ALKALI-THOLEIITIC BASALT PROBLEM - HAMBURGER STAND OPTION

PROBLEM NAME CORLFNVT 11 VARIABLES , 5 FACTORS

SYMMETRIC %CORRELATION¤ MATRIX -LOWER HALF -ELEMENT%1,1¤ TO ELEMENT % 11, 11¤

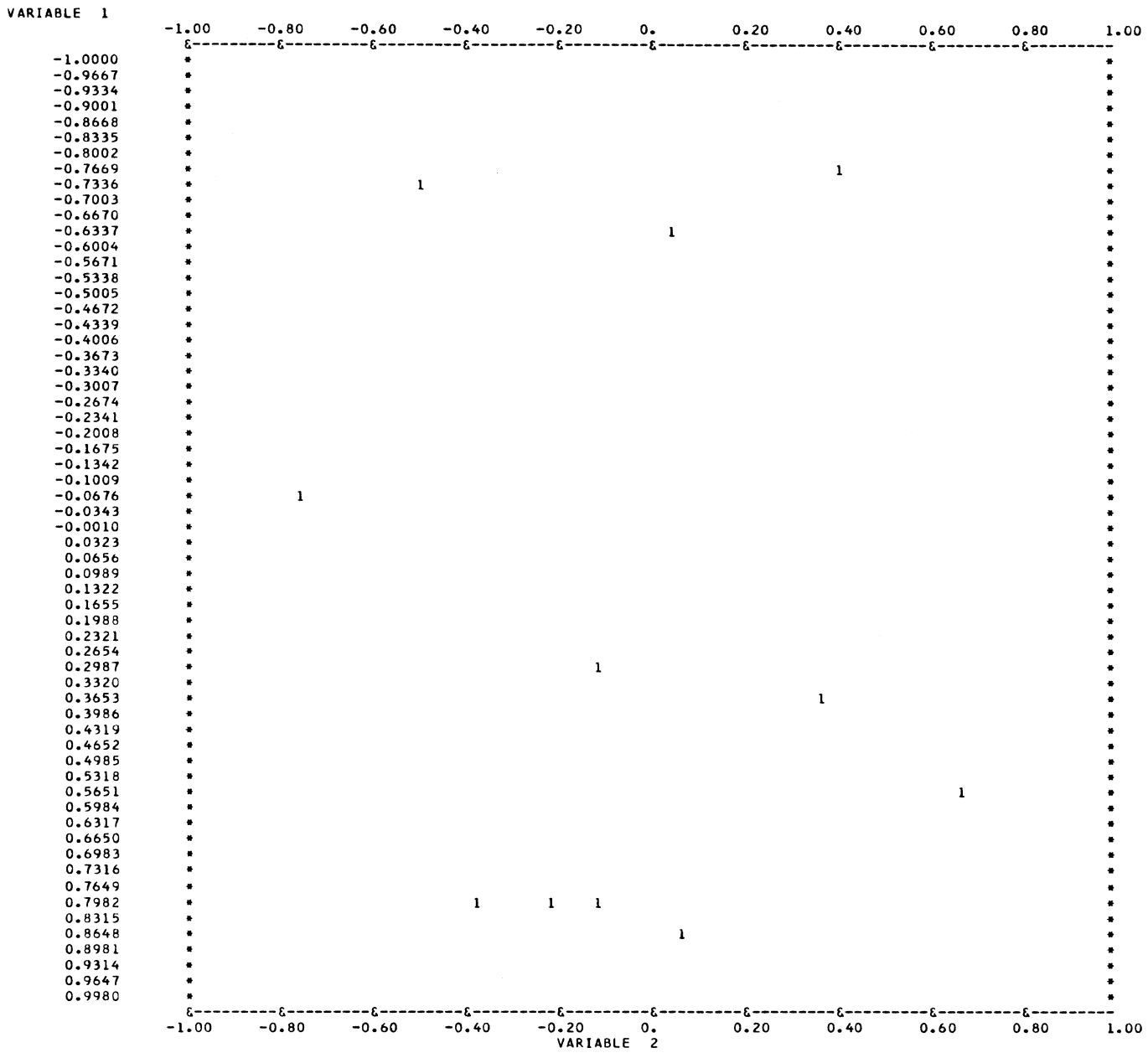
	1	2	3	4	5	6	7	8	9	10	11
1	1.000										
2	-0.146	1.000									
3	0.071	0.296	1.000								
4	-0.359	0.113	0.286	1.000							
5	0.175	-0.015	-0.493	-0.829	1.000						
6	-0.165	0.077	0.312	0.298	-0.338	1.000					
7	-0.301	-0.454	-0.860	-0.257	0.370	-0.216	1.000				
8	-0.065	0.053	-0.334	-0.329	0.322	-0.143	0.175	1.000			
9	0.183	0.137	0.619	0.200	-0.329	0.109	-0.614	-0.627	1.000		
10	-0.188	0.316	0.611	0.414	-0.580	0.331	-0.520	-0.556	0.718	1.000	
11	-0.021	0.200	0.510	0.310	-0.430	0.178	-0.481	-0.553	0.734	0.749	1.000

FACTOR NUMBER	TEST NUMBER	FACTOR LOADING	VARIANCE %EIGENVALUE¤	EIGENVECTOR	ITERATIONS REQUIRED
1	1	-0.04197	4.72366	-0.01931	15
	2	0.32331		0.14876	
	3	0.80859		0.37204	
	4	0.57667		0.26533	
	5	-0.70155		-0.32279	
	6	0.39242		0.18056	
	7	-0.74227		-0.34152	
	8	-0.61390		-0.28246	
	9	0.80193		0.36897	
	10	0.88112		0.40541	
	11	0.79846		0.36738	
2	1	-0.75988	1.76535	-0.57192	30
	2	-0.11348		-0.08541	
	3	-0.22378		-0.16842	
	4	0.65565		0.49346	
	5	-0.49258		-0.37073	
	6	0.35337		0.26596	
	7	0.40775		0.30688	
	8	0.04484		0.03375	
	9	-0.37493		-0.28219	
	10	0.05974		0.04496	
	11	-0.12321		-0.09273	
3	1	-0.17123	1.32522	-0.14874	33
	2	0.73667		0.63993	
	3	0.26339		0.22880	
	4	-0.01092		-0.00948	
	5	0.06151		0.05343	
	6	0.19610		0.17035	
	7	-0.40990		-0.35607	
	8	0.59785		0.51933	
	9	-0.25966		-0.22556	
	10	-0.04904		-0.04260	
	11	-0.21496		-0.18673	
4	1	0.49763	0.98663	0.50099	24
	2	-0.43697		-0.43992	
	3	0.21353		0.21497	
	4	0.17581		0.17699	
	5	-0.33223		-0.33447	
	6	0.33698		0.33926	
	7	-0.24300		-0.24464	
	8	0.16723		0.16836	
	9	-0.13518		-0.13609	
	10	-0.25373		-0.25544	
	11	-0.27920		-0.28109	
5	1	-0.08089	0.79193	-0.09090	20
	2	-0.07207		-0.08099	
	3	0.00798		0.00897	
	4	-0.34130		-0.38352	
	5	0.28473		0.31996	
	6	0.73829		0.82963	
	7	0.11810		0.13271	
	8	-0.10007		-0.11245	
	9	0.02595		0.02917	
	10	0.10597		0.11908	
	11	0.04051		0.04552	

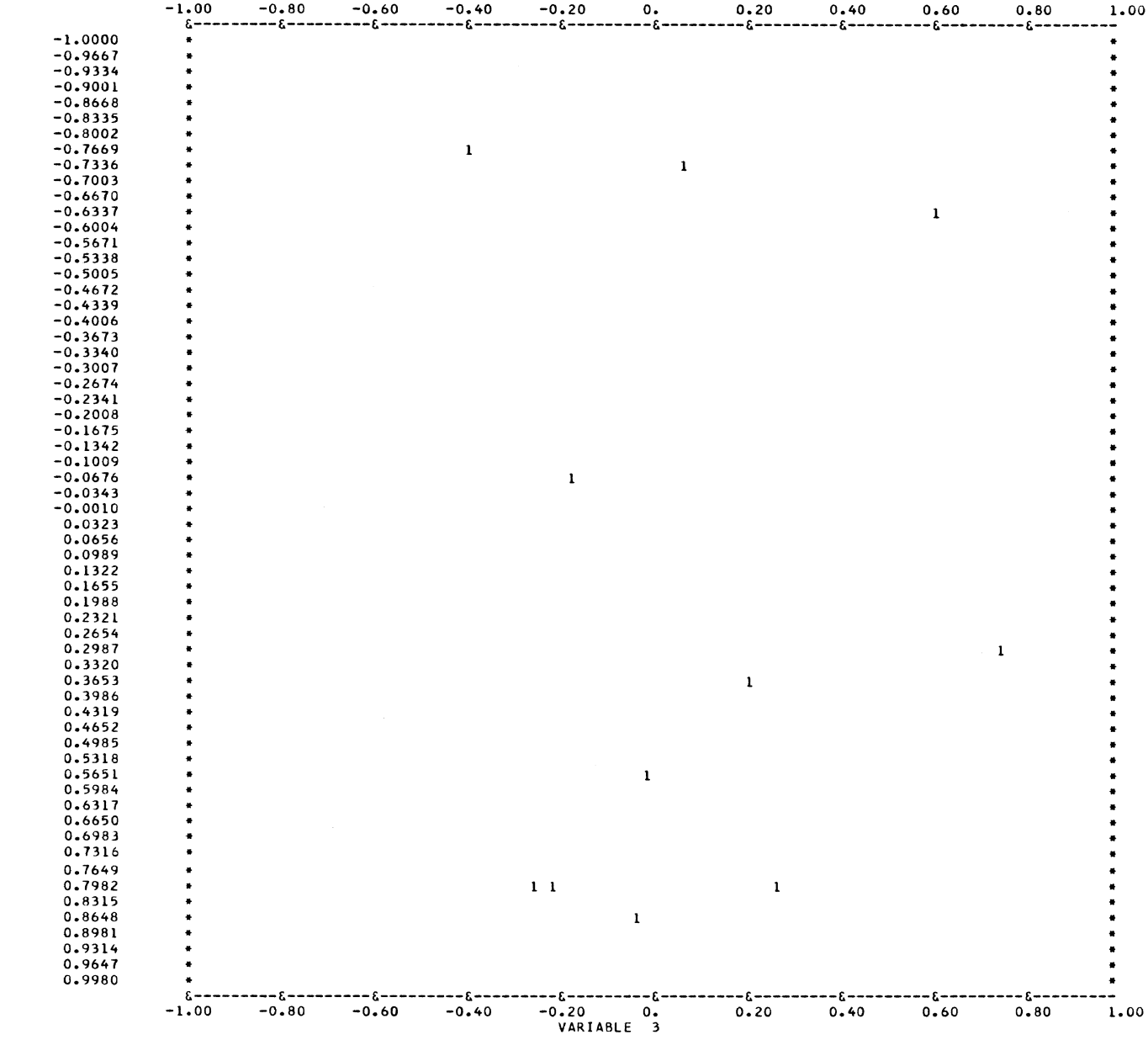
PRINT OUT OF RESIDUAL MATRIX -LOWER HALF -ELEMENT%1,1¤ TO ELEMENT % 11, 11¤

	1	2	3	4	5	6	7	8	9	10	11
1	0.137										
2	0.119	0.144									
3	-0.126	-0.091	0.181								
4	0.046	0.061	-0.065	0.090							
5	-0.030	-0.014	0.017	0.054	0.070						
6	0.046	0.047	-0.056	0.034	0.001	0.024					
7	0.038	0.036	-0.010	-0.017	-0.039	0.006	0.042				
8	-0.045	-0.118	-0.020	-0.062	-0.039	-0.017	-0.001	0.226			
9	-0.043	-0.031	-0.016	0.014	0.012	0.004	-0.008	0.063	0.130		
10	0.021	-0.029	-0.022	-0.053	-0.044	-0.019	0.015	0.065	-0.016	0.142	
11	0.024	-0.033	-0.047	-0.009	-0.022	0.015	0.001	0.122	-0.047	-0.033	0.221

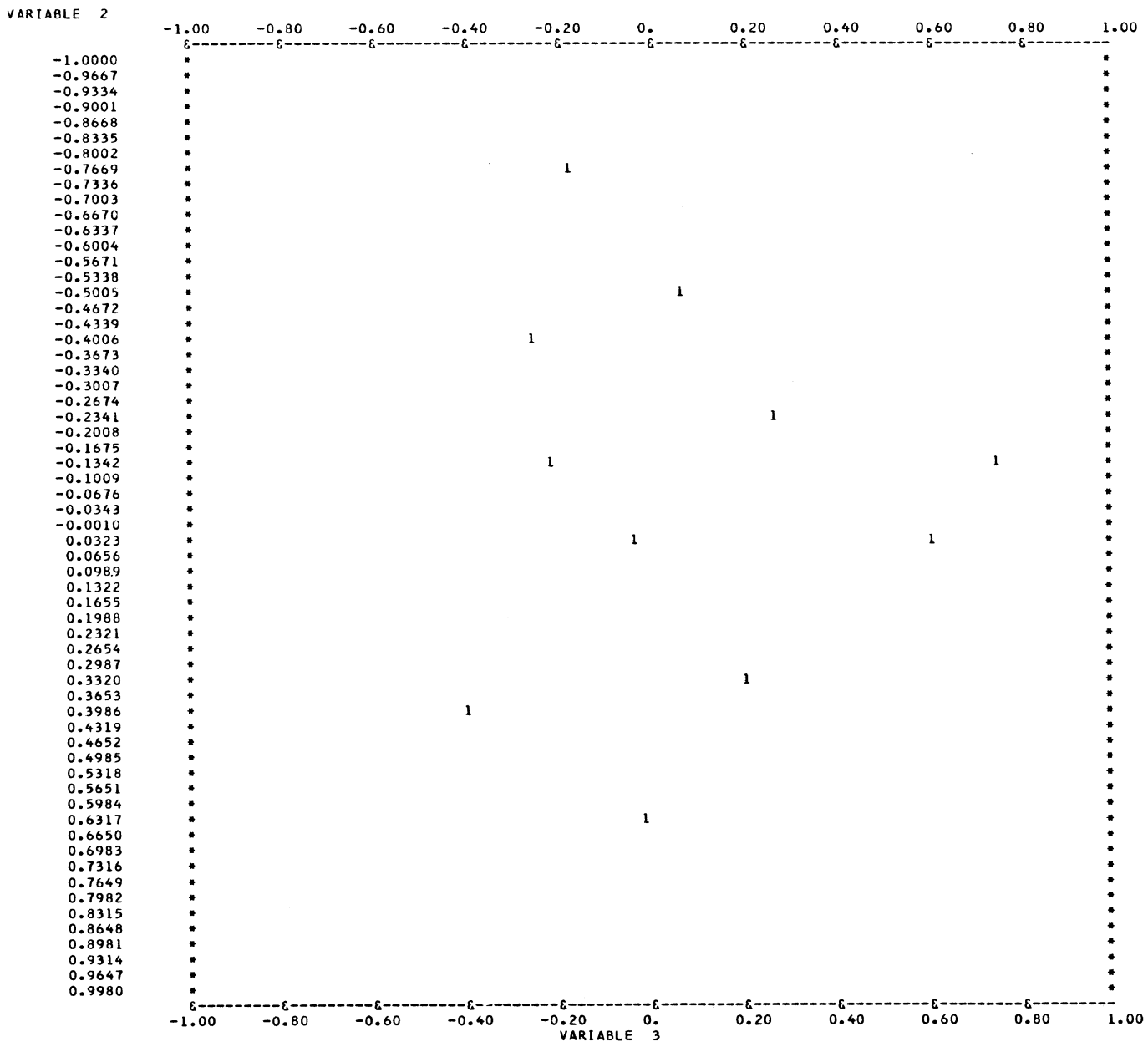
SCATTERGRAM OF FACTOR LOADING
FACTOR 1 VS. 2



SCATTERGRAM OF FACTOR LOADING
FACTOR 1 VS. 3



SCATTERGRAM OF FACTOR LOADING
FACTOR 2 VS. 3



VARIMAX ROTATION

ALKALI-THOLEIITIC BASALT PROBLEM - HAMBURGER STAND OPTION

PROBLEM NAME CORLFNVT 11 VARIABLES , 3 FACTORS

THE ORIGINAL MATRIX OF FACTOR LOADINGS

	F 1	F 2	F 3	F 4	F 5	F 6	F 7	F 8	F 9	F 10
1	-0.04197	-0.75988	-0.17123	0.49763	-0.08089					
2	0.32331	-0.11348	0.73667	-0.43697	-0.07207					
3	0.80859	-0.22378	0.26339	0.21353	0.00798					
4	0.57667	0.65565	-0.01092	0.17581	-0.34130					
5	-0.70155	-0.49258	0.06151	-0.33223	0.28473					
6	0.39242	0.35337	0.19610	0.33698	0.73829					
7	-0.74227	0.40775	-0.40990	-0.24300	0.11810					
8	-0.61390	0.04484	0.59785	0.16723	-0.10007					
9	0.80193	-0.37493	-0.25966	-0.13518	0.02595					
10	0.88112	0.05974	-0.04904	-0.25373	0.10597					
11	0.79846	-0.12321	-0.21496	-0.27920	0.04051					
SUM SQ	4.72366	1.76535	1.32522	0.98663	0.79193					
VAREXP	42.94236	16.04864	12.04744	8.96939	7.19934					
CUMPER	42.94236	58.99100	71.03844	80.00783	87.20717					

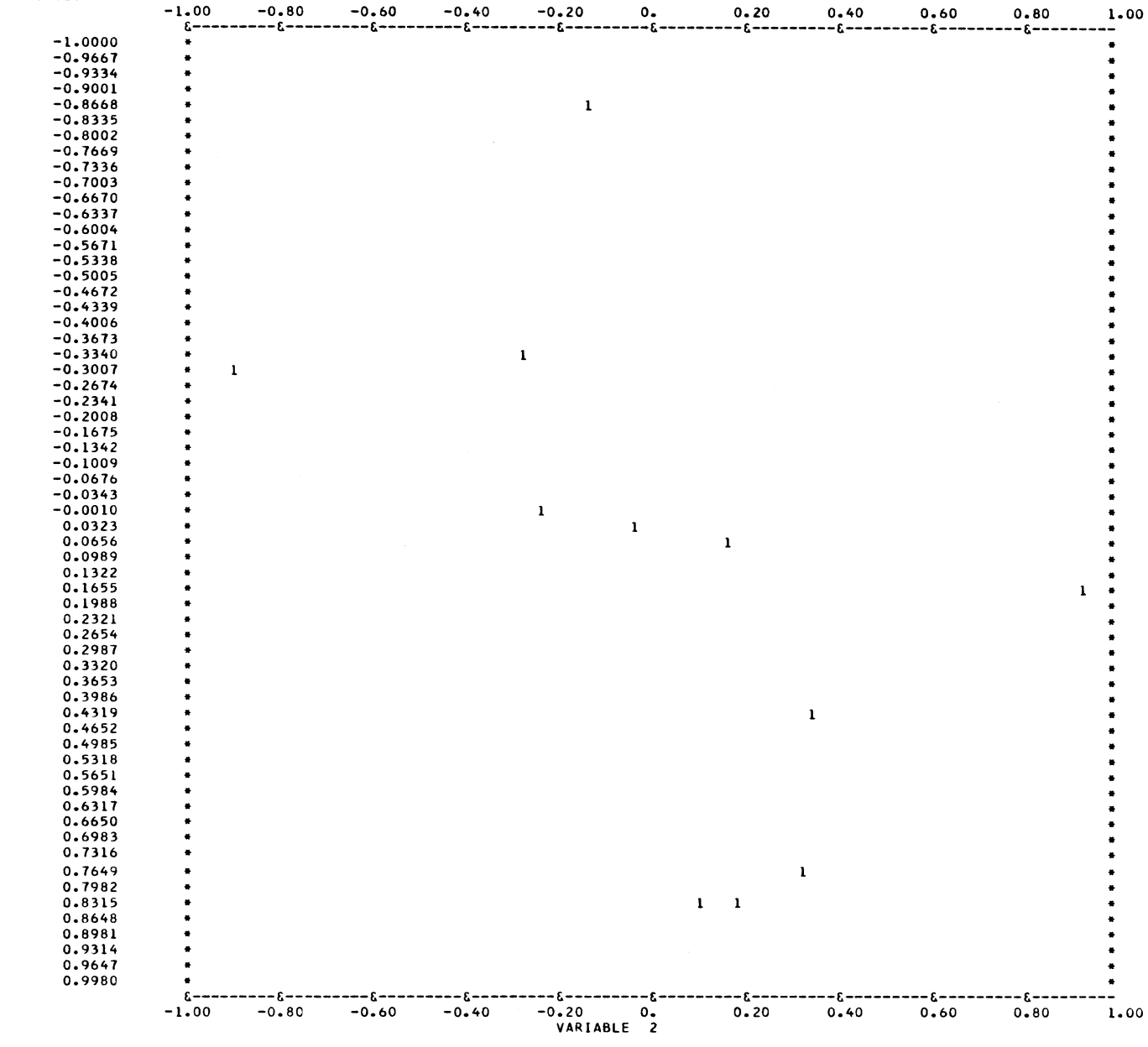
COMMUNALITIES	
1	0.86269
2	0.85623
3	0.81893
4	0.90993
5	0.93003
6	0.97594
7	0.95823
8	0.77429
9	0.87003
10	0.85795
11	0.77853

THE ROTATED MATRIX OF FACTOR LOADINGS

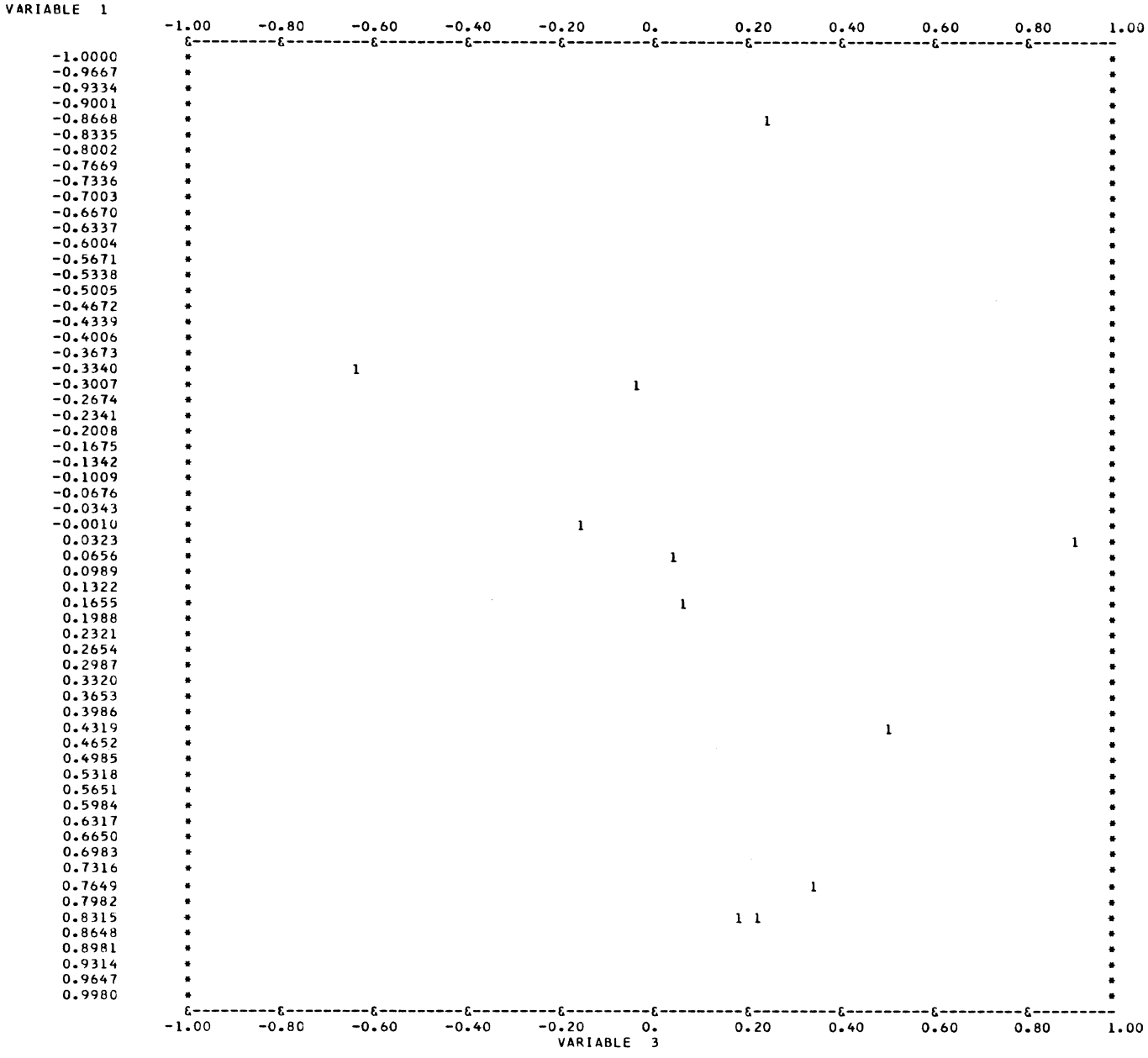
	F 1	F 2	F 3	F 4	F 5	F 6	F 7	F 8	F 9	F 10
1	0.02188	-0.24311	-0.15438							
2	0.05417	-0.03730	0.90959							
3	0.43683	0.34162	0.49215							
4	0.17157	0.91300	0.05210							
5	-0.27383	-0.90830	-0.03122							
6	0.09375	0.16972	0.03961							
7	-0.32687	-0.27531	-0.63464							
8	-0.83572	-0.14756	0.23018							
9	0.85753	0.09460	0.18888							
10	0.77234	0.31043	0.33508							
11	0.83380	0.18083	0.21840							
SUM SQ	3.13979	2.10017	1.75007							
VAREXP	28.54359	19.09247	15.90969							
CUMPER	28.54359	47.63605	63.54574							

COMMUNALITIES	
1	0.08342
2	0.83169
3	0.54974
4	0.86572
5	0.90097
6	0.03916
7	0.58540
8	0.77319
9	0.77998
10	0.80515
11	0.77561

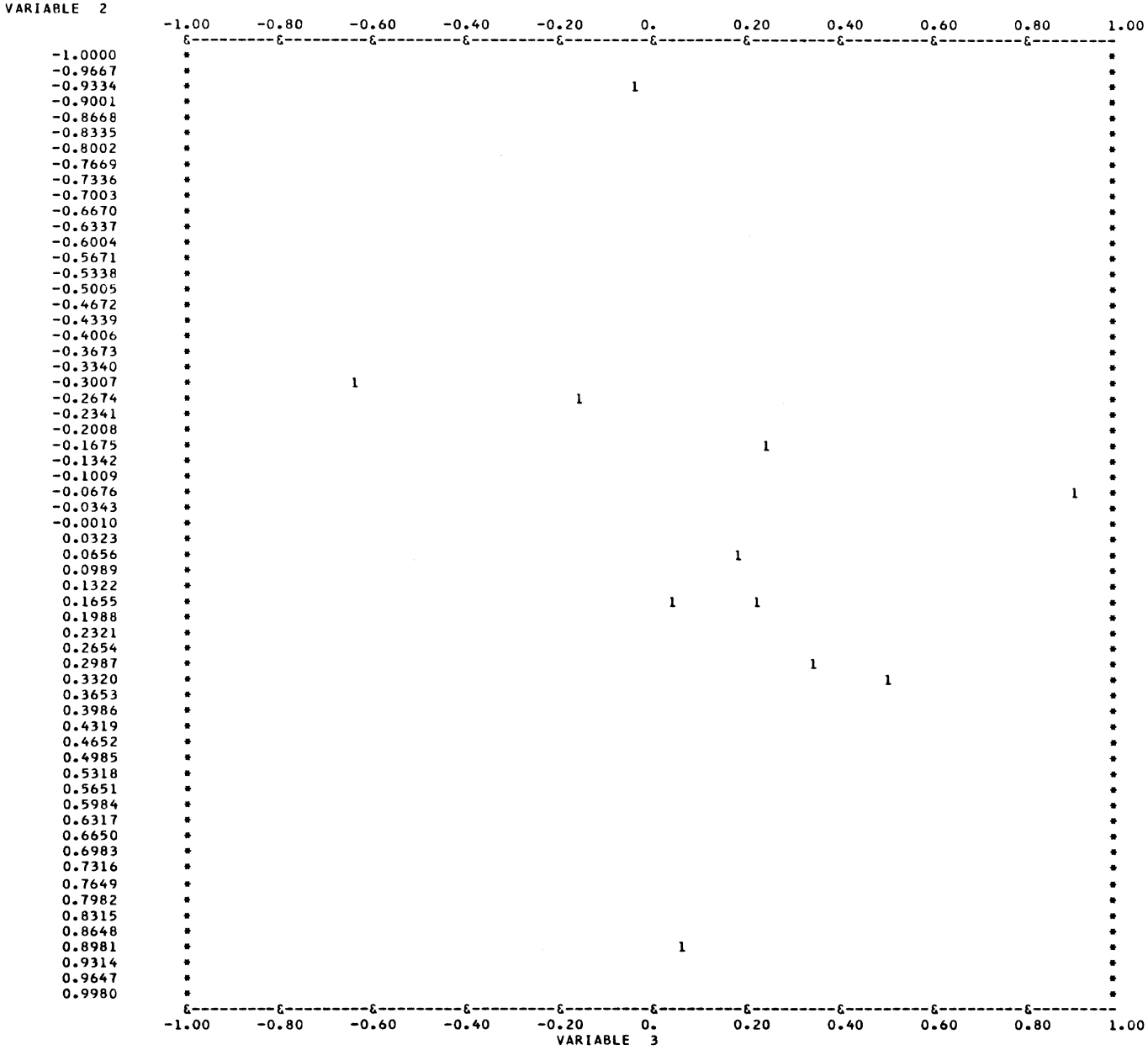
SCATTERGRAM OF ROTATED FACTORS
FACTOR 1 VS. 2



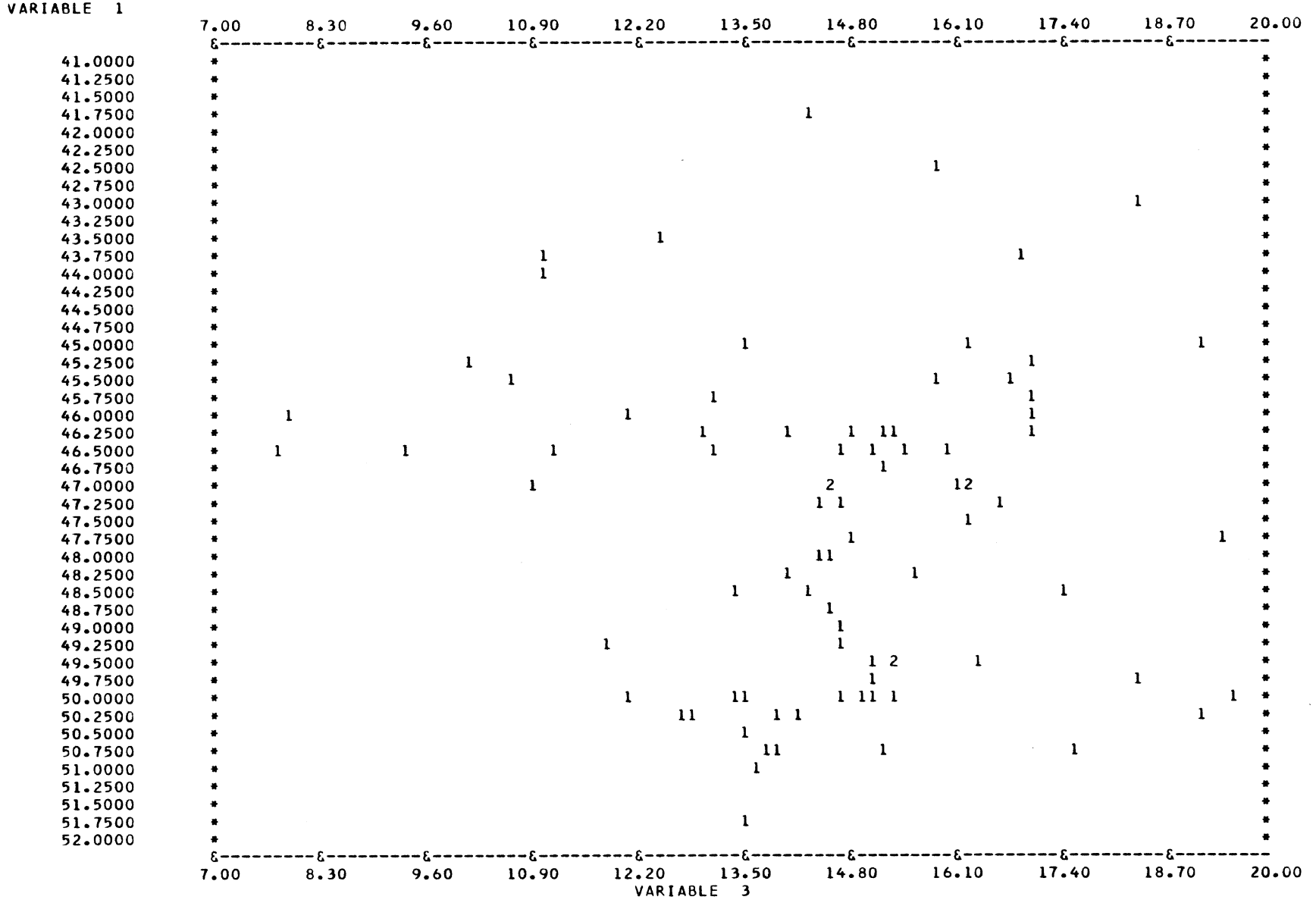
SCATTERGRAM OF ROTATED FACTORS
FACTOR 1 VS. 3



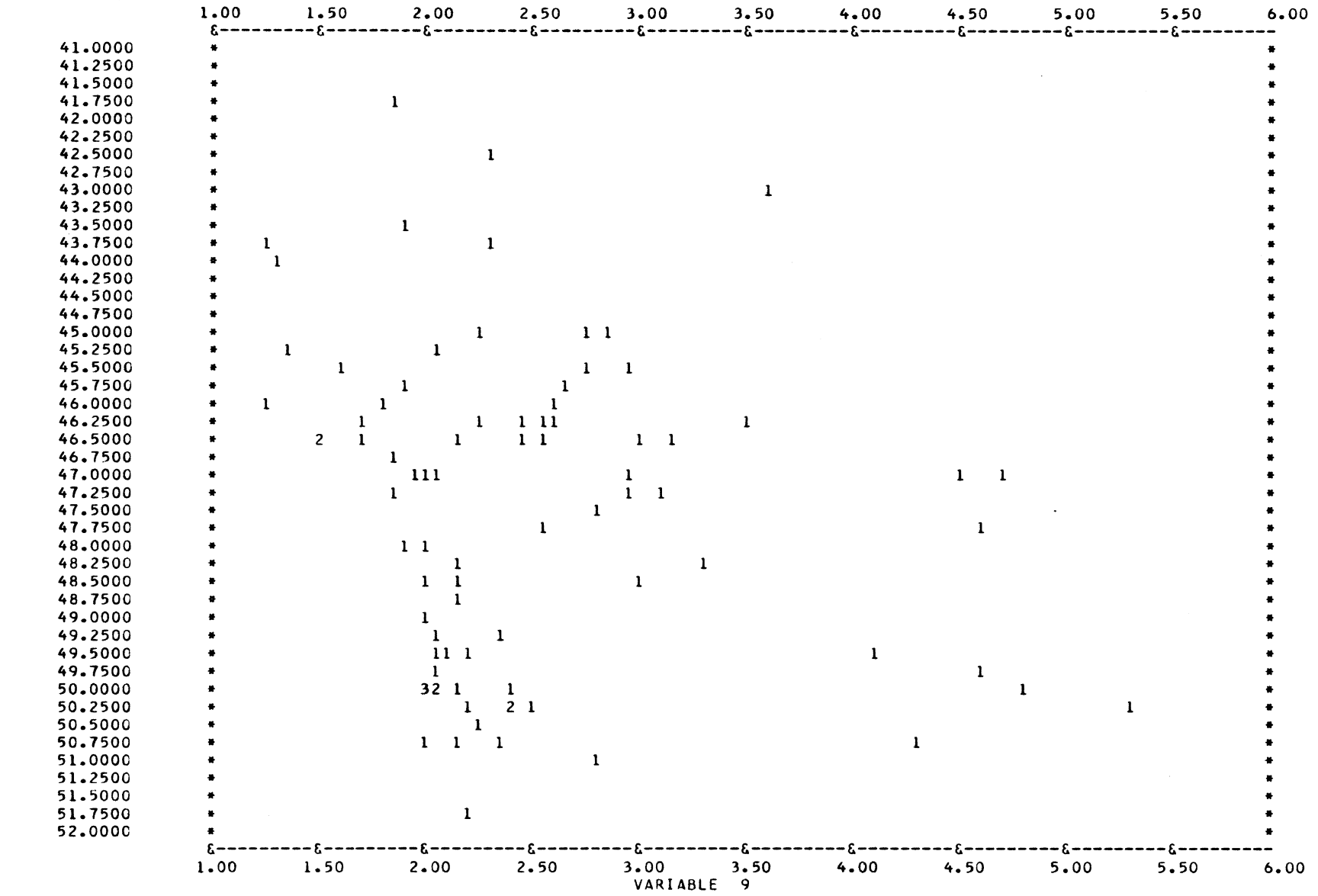
SCATTERGRAM OF ROTATED FACTORS
FACTOR 2 VS. 3

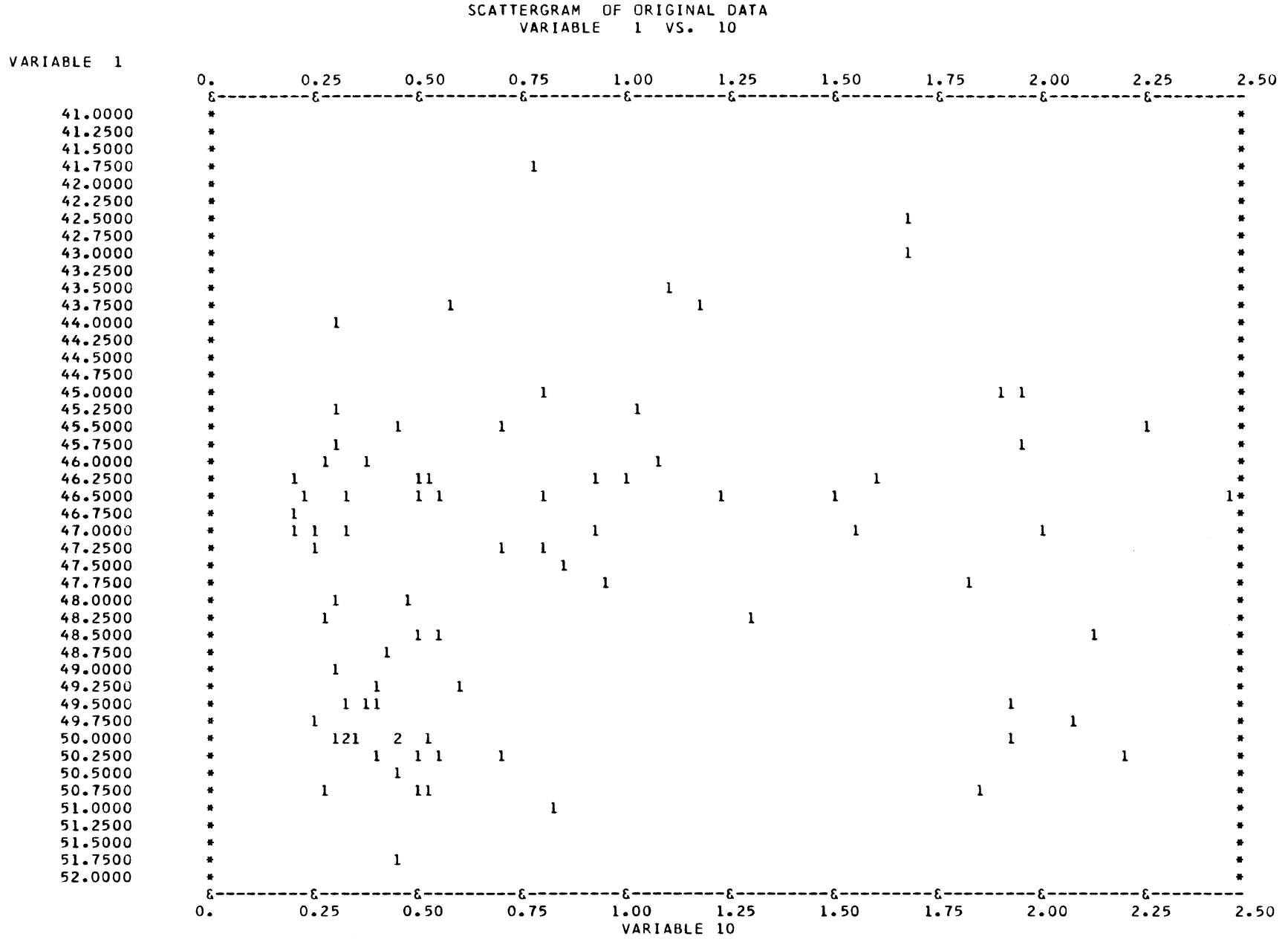


SCATTERGRAM OF ORIGINAL DATA
VARIABLE 1 VS. 3



SCATTERGRAM OF ORIGINAL DATA
VARIABLE 1 VS. 9




SCATTERGRAM OF ORIGINAL DATA
VARIABLE 1 VS. 10
VARIABLE 1
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41.2500
41.5000
41.7500
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42.7500
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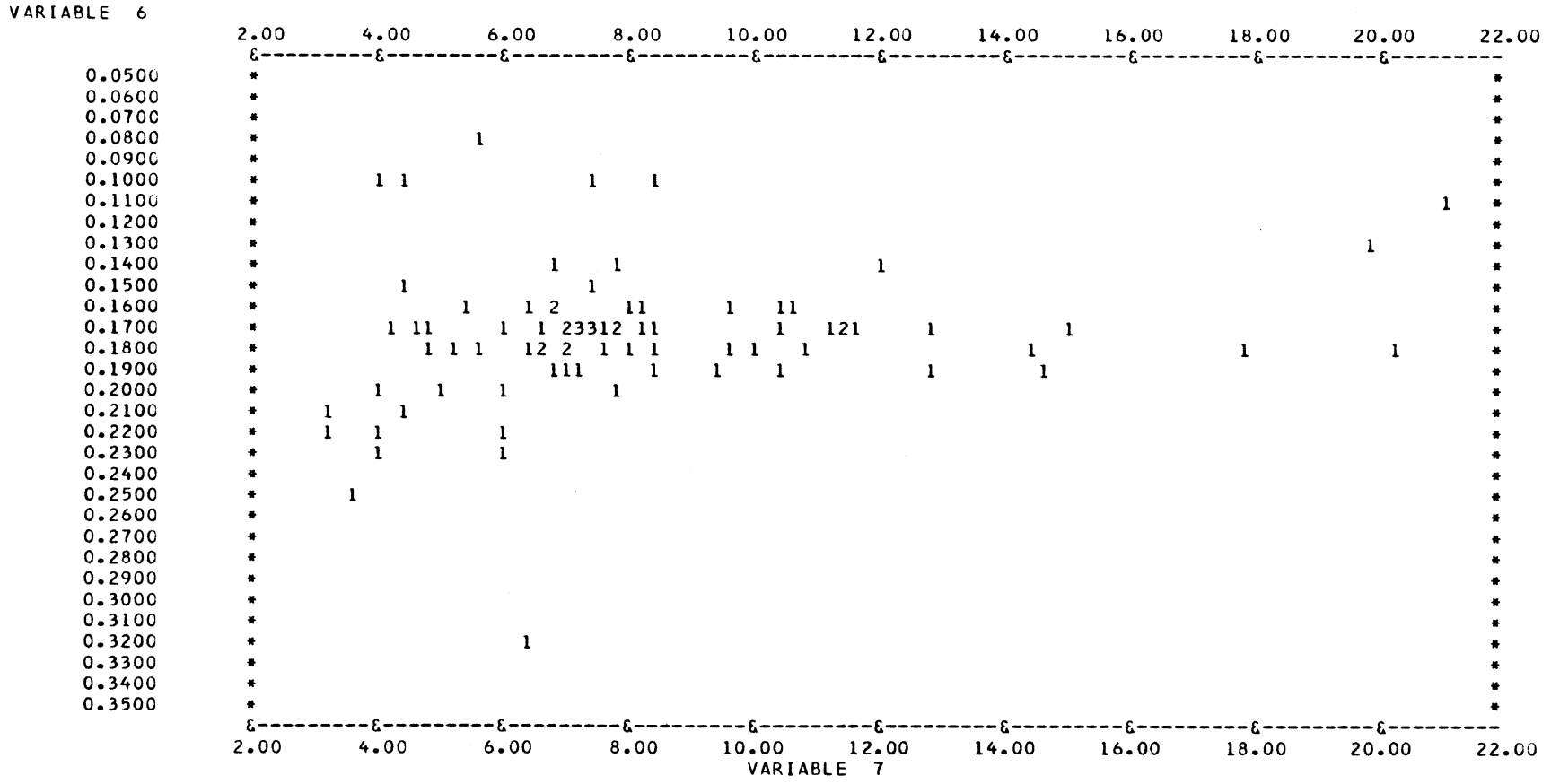
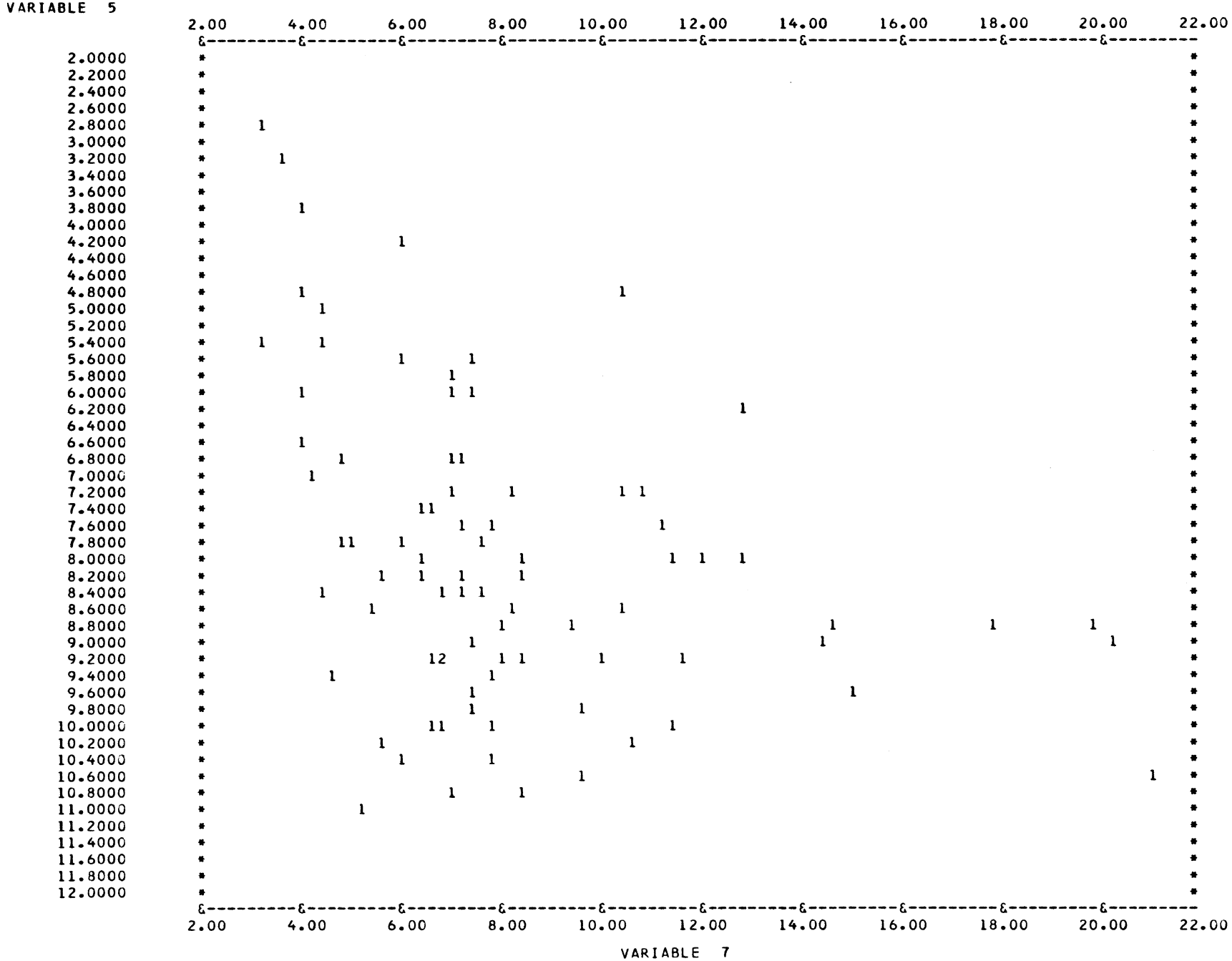
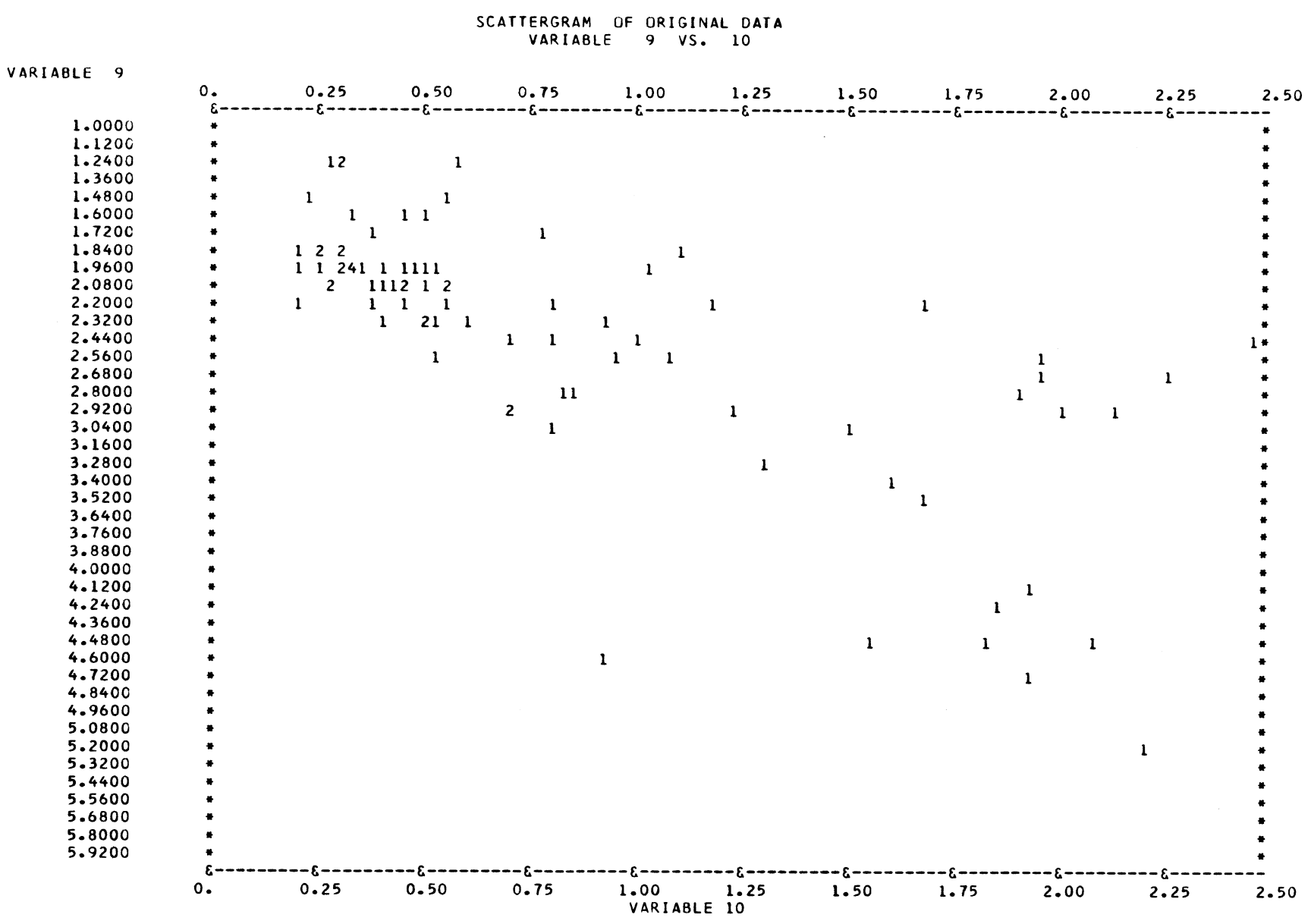
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
VARIABLE 10

SCATTERGRAM OF ORIGINAL DATA
VARIABLE 6 VS. 7



SCATTERGRAM OF ORIGINAL DATA
VARIABLE 5 VS. 7




SCATTERGRAM OF ORIGINAL DATA
VARIABLE 9 VS. 10
VARIABLE 9
1.0000
1.1200
1.2400
1.3600
1.4800
1.6000
1.7200
1.8400
1.9600
2.0800
2.2000
2.3200
2.4400
2.5600
2.6800
2.8000
2.9200
3.0400
3.1600
3.2800
3.4000
3.5200
3.6400
3.7600
3.8800
4.0000
4.1200
4.2400
4.3600
4.4800
4.6000
4.7200
4.8400
4.9600
5.0800
5.2000
5.3200
5.4400
5.5600
5.6800
5.8000
5.9200
0.
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
2.25
2.50
VARIABLE 10

PROBLEM NAME QMODFNVT

IN	1	50.2500	2.1200	19.0300	4.5300	5.5000	0.2200	3.1100	5.9800	5.3000	2.2000	1.1400
IN	2	45.7400	4.1600	16.7600	9.3900	2.8300	0.2100	3.2400	9.0200	2.7300	2.2400	0.6100
IN	3	49.7300	3.0500	16.3900	7.5800	3.9800	0.2300	4.0600	7.1700	4.1200	1.9300	0.8400
IN	4	49.7900	2.5100	18.3700	6.0300	4.8200	0.2200	4.0100	6.6800	4.5800	2.0800	0.5600
IN	5	47.9900	2.6200	19.3600	5.8300	5.1700	0.2100	4.3900	6.5400	4.5800	1.8200	0.6300
IN	6	45.9400	3.0000	17.0400	7.8100	3.2800	0.2500	3.6700	10.1400	2.6300	1.9400	0.5500
IN	7	46.5200	2.7800	16.0000	5.5600	4.2000	0.2300	6.0900	10.4000	2.4500	2.4500	0.5000
IN	8	45.1000	0.7000	19.0500	5.3700	5.7300	0.2200	6.0300	7.0600	2.8500	1.9000	0.6600
IN	9	47.2000	3.8500	16.2200	5.2000	6.9500	0.1800	4.7700	8.4900	2.9300	2.0000	0.7400
IN	10	50.9200	2.5500	17.5900	3.8000	6.6900	0.2000	3.9000	6.9700	4.2800	1.8600	0.4000
IN	11	50.0900	2.4700	19.4900	0.7300	8.4700	0.1500	4.3300	6.9200	4.8200	1.9300	0.7800
IN	12	47.0300	1.9200	16.2200	5.5300	6.0700	0.1000	4.0000	8.0800	4.5000	1.5400	0.2400
IN	13	46.6800	4.2000	15.0100	6.3500	5.4400	0.1000	4.3000	9.8400	3.1300	1.5100	0.4700
IN	14	48.6500	3.8000	17.4300	2.8000	7.1200	0.1700	4.1400	9.7200	2.9800	2.1300	0.5200
IN	15	45.2400	3.2200	16.1700	4.5200	6.8600	0.1900	7.0100	9.7600	2.7500	1.9500	0.4800
IN	16	43.0400	4.0000	18.2600	2.9100	7.8200	0.2000	4.9500	9.8000	3.6200	1.6700	0.5500
IN	17	46.4200	1.5800	15.2800	2.2200	5.9300	0.1700	7.0600	11.4800	3.4900	1.6100	0.7800
IN	18	48.4200	3.2500	13.9700	4.1700	9.5700	0.1700	4.6100	8.8600	3.3000	1.2900	0.9100
IN	19	43.5800	3.3000	12.4900	8.4100	4.9200	0.1900	10.3300	9.3400	1.9100	1.1000	0.2400
IN	20	46.5100	2.9800	15.4800	3.4100	8.6800	0.1700	8.1700	8.8500	3.0000	1.2200	0.5900
IN	21	42.6000	3.7900	15.8900	2.8600	8.3400	0.1800	8.4500	9.8800	2.3000	1.6700	0.4400
IN	22	45.6000	3.1900	15.8900	5.9800	7.5400	0.1700	6.5600	9.4900	2.9500	0.7000	0.4000
IN	23	47.7200	2.4800	16.1900	3.8200	8.2500	0.0800	5.6800	11.2000	2.8000	0.8400	0.4300
IN	24	43.7500	4.2500	16.9200	1.8200	9.3000	0.1800	6.7000	10.8200	2.2900	1.1800	0.3900
IN	25	46.4900	3.0900	17.0700	5.3500	7.8400	0.1700	4.8000	10.5200	2.6100	0.5200	0.3500
IN	26	46.0500	2.6500	17.0300	3.9000	7.4700	0.3200	6.3000	11.2400	2.6000	1.0700	0.
IN	27	46.4300	3.0300	15.2200	3.9700	8.1900	0.1000	8.4000	10.3700	2.5500	0.9900	0.3300
IN	28	47.3200	3.0900	16.6800	2.6300	8.6700	0.1600	5.4300	11.2700	3.0800	0.7900	0.5300
IN	29	50.0400	2.2200	15.3600	5.3900	5.7800	0.1700	7.3200	10.1700	2.0200	0.3300	0.3100
IN	30	45.2500	4.0000	17.0600	2.3000	8.4200	0.1800	7.5500	11.0800	2.0500	1.0300	0.2700
IN	31	47.1900	2.2700	10.9500	3.3100	10.2100	0.1600	10.5200	9.7300	4.6900	0.9300	0.5500
IN	32	47.4200	3.4600	14.3500	3.4100	10.3300	0.1800	5.5700	9.8000	2.9500	0.6900	0.4300
IN	33	46.6500	3.2200	14.7200	3.6300	8.9800	0.1800	7.9600	10.1400	2.5300	0.8000	0.3300
IN	34	51.2400	3.7400	13.6000	1.8700	11.1900	0.1800	5.1200	9.0300	2.8100	0.8300	0.4100
IN	35	41.8300	3.1600	14.3200	4.8100	8.9800	0.1900	9.4200	8.8300	1.8300	0.7700	0.2900
IN	36	48.5500	2.8300	14.2900	4.8900	8.0400	0.1800	6.4200	10.7600	2.1500	0.5500	0.2800
IN	37	48.1700	2.4400	14.4600	5.5800	6.0500	0.1800	6.9900	11.0300	1.8800	0.2900	0.2000
IN	38	49.5000	2.1000	15.3800	4.5100	6.9900	0.1700	7.2300	10.4400	2.1000	0.3900	0.2800
IN	39	46.9100	2.4400	15.2300	5.5400	6.1800	0.1700	7.3800	10.9000	1.8500	0.1900	0.2000
IN	40	47.7900	1.9000	14.8000	2.6300	10.0400	0.1400	6.8900	11.3100	2.5600	0.9400	0.2600
IN	41	50.0200	2.2300	15.0500	3.7700	7.3700	0.1700	7.0100	10.1700	2.0500	0.3300	0.2700
IN	42	49.8600	2.4300	15.1100	3.6600	7.8200	0.1700	6.0000	10.3400	2.0500	0.2600	0.2700
IN	43	48.2900	2.5600	15.5400	3.2700	7.8800	0.1700	7.7000	10.2100	2.1700	0.2800	0.2700
IN	44	50.4000	3.2600	13.9100	1.8000	10.0900	0.1800	6.5700	10.6500	2.5200	0.6900	0.3000
IN	45	45.7700	2.4700	13.1600	2.9700	9.2700	0.1700	11.6400	10.2300	1.8800	0.2900	0.2400
IN	46	45.1400	3.0400	13.4900	3.6000	9.2700	0.1800	10.0200	10.6000	2.2400	0.8000	0.2600
IN	47	49.4200	2.4200	11.8300	3.8300	8.0800	0.1400	12.0400	9.2800	2.3500	0.5900	0.3900
IN	48	49.6900	2.6000	15.2600	3.1600	8.3500	0.1600	6.5000	10.7800	2.2000	0.3700	0.2500
IN	49	43.9600	2.3600	11.0600	5.2900	6.3700	0.1900	12.8800	11.8800	1.2600	0.5700	0.3200
IN	50	50.2000	2.1500	14.7200	3.3800	7.7900	0.1700	7.8800	9.8100	2.0000	0.3600	0.2700
IN	51	50.2000	2.4000	14.9300	3.6400	7.6700	0.1700	7.1500	10.1600	2.0500	0.3000	0.2700
IN	52	48.2400	3.0900	14.4800	3.5800	10.4200	0.2000	6.0500	10.0200	2.0000	0.4800	0.3000
IN	53	50.8000	1.9300	15.2500	2.9100	7.2300	0.1600	8.2700	9.8300	2.1500	0.2800	0.2500
IN	54	48.8400	2.5800	14.5900	2.7800	8.4500	0.1700	7.2500	10.9000	2.1500	0.4200	0.3300
IN	55	49.6700	2.3300	15.0800	2.8600	8.5700	0.1600	6.7600	10.5100	2.0600	0.3200	0.2600
IN	56	47.1200	2.3400	14.5100	4.3900	7.2100	0.1800	10.7400	10.3600	1.9400	0.2500	0.2500
IN	57	46.3900	2.1300	12.9400	2.0500	10.1600	0.1700	11.3800	10.8100	2.4300	0.9300	0.3200
IN	58	48.5700	2.6100	13.3400	2.9500	8.6600	0.1700	10.4100	10.2600	2.0200	0.5000	0.2600
IN	59	46.3100	3.1000	14.8300	4.0600	9.2600	0.1900	6.7700	11.3000	2.2500	0.2000	0.2500
IN	60	47.2500	2.1600	14.7000	3.9100	7.2700	0.1600	10.4600	10.2200	1.8600	0.2400	0.2500
IN	61	47.1000	2.3100	16.0500	3.1200	8.2700	0.1900	7.1200	11.9100	2.0000	0.1900	0.2600
IN	62	50.8700	2.8600	13.9400	1.8500	9.0700	0.1700	7.3500	11.0900	2.3400	0.4900	0.2500
IN	63	49.3700	2.5000	14.7300	1.7100	9.3900	0.1600	6.8700	10.8600	2.0500	0.4000	0.2700
IN	64	51.7700	4.0100	13.5400	0.7500	9.6300	0.1500	7.3300	10.5700	2.1800	0.4500	0.2600
IN	65	46.4300	2.2900	14.0000	3.3400	8.1700	0.1700	11.4100	11.8600	1.6900	0.4900	0.2500
IN	66	50.0700	2.7000	13.3200	1.9200	9.2800	0.1600	8.0100	10.6400	2.1600	0.4500	0.2600
IN	67	50.3200	3.1000	12.8300	1.7400	9.9300	0.1000	7.3900	11.0600	2.3800	0.4100	0.3000
IN	68	50.6800	2.5400	13.5500	1.3900	9.3500	0.1700	8.4700	10.9800	2.2400	0.4500	0.2600
IN	69	49.0700	2.4800	14.6200	2.0000	9.5200	0.1700	7.8000	10.3800	2.0100	0.3100	0.2800
IN	70	47.1400	2.8800	14.5700	2.0900	10.8500	0.1900	8.3500	10.0900	2.0300	0.3300	0.3100
IN	71	46.1900	2.1500	12.0200	4.0800	8.1900	0.1700	12.7500	10.7300	1.7900	0.3800	0.2000
IN	72	50.2400	2.9200	13.4600	1.1700	10.9400	0.1800	7.0400	10.3000	2.4000	0.5200	0.1700
IN	73	50.8800	2.5900	13.7500	0.7300	10.4200	0.2000	7.7700	10.7600	2.0000	0.5200	0.2400
IN	74	50.0300	2.5700	12.1000	2.1000	9.9700	0.1600	9.5700	10.5800	2.0100	0.4400	0.2100
IN	75	50.3700	2.3300	14.2000	1.2800	10.1000	0.1400	7.7500	11.2400	2.2000	0.5600	0.0200
IN	76	50.4600	2.1400	12.7500	0.8200	10.6800	0.1800	9.6800	10.4300	2.4200	0.5100	0.1900
IN	77	45.6400	2.3400	10.6100	3.0200	9.0200	0.1800	14.3200	10.8800	1.6200	0.4600	0.2500
IN	78	44.2400	2.3400	11.0100	3.3600	8.9700	0.1900	14.6700	10.3600	1.3200	0.3000	0.2500
IN	79	46.6000	2.1500	11.2100	2.0400	9.6100	0.1700	15.0100	10.6000	1.5200	0.5600	0.1800
IN	80	45.3000	1.8500	10.1100	3.7500	8.9100	0.1800	17.8700	8.9600	1.3500	0.3000	0.2000
IN	81	46.5700	1.6700	7.8100	2.4000	8.9100	0.1300	19.7400	10.6500	1.7000	0.3300	0.3400
IN	82	46.0100	1.6100	7.9600	2.5400	9.0900	0.1800	20.1900	10.4900	1.2600	0.2700	0.1700
IN	83	46.5000	1.7000	9.3700	2.4700	10.7900	0.1100	21.0000	6.2500	1.5200	0.2200	0.1000
IN	84	46.6800	1.9100	13.1500	4.7100	7.6200	0.1700	11.1200	9.6800	2.1500	0.4900	0.2200

DIV	1	0.97064	0.49882	0.97640	0.48243	0.49151	0.68750	0.14810	0.50210	1.00000	0.89796	1.00000	0.
DIV		0.											
DIV	2	0.88352	0.97882	0.85993	1.00000	0.25290	0.65625	0.15429	0.75735	0.51509	0.91429	0.53509	0.
DIV		0.											
DIV	3	0.96059	0.71765	0.84094	0.80724	0.35567	0.71875	0.19333	0.60202	0.77736	0.78776	0.73684	0.
DIV		0.											
DIV	4	0.96175	0.59059	0.94253	0.64217	0.43074	0.68750	0.19095	0.56087	0.86415	0.84898	0.49123	0.
DIV		0.											
DIV	5	0.92698	0.61647	0.99333	0.62087	0.46202	0.65625	0.20905	0.54912	0.86415	0.74286	0.55263	0.
DIV		0.											
DIV	6	0.88739	0.70588	0.87429	0.83174	0.29312	0.78125	0.17476	0.85139	0.49623	0.79184	0.48246	0.
DIV		0.											
DIV	7	0.89859	0.65412	0.82093	0.59212	0.37534	0.71875	0.29000	0.87322	0.46226	1.00000	0.43860	0.
DIV		0.											
DIV	8	0.87116	0.16471	0.97742	0.57188	0.51206	0.68750	0.28714	0.59278	0.53774	0.77551	0.57895	0.
DIV		0.											
DIV	9	0.91172	0.90588	0.83222	0.55378	0.62109	0.56250	0.22714	0.71285	0.55283	0.81633	0.64912	0.
DIV		0.											
DIV	10	0.98358	0.60000	0.90251	0.40469	0.59786	0.62500	0.18571	0.58522	0.80755	0.75918	0.35088	0.
DIV		0.											
DIV	11	0.96755	0.58118	1.00000	0.07774	0.75693	0.46875	0.20619	0.58102	0.90943	0.78776	0.68421	0.
DIV		0.											
DIV	12	0.90844	0.45176	0.83222	0.58892	0.54245	0.31250	0.19048	0.67842	0.84906	0.62857	0.21053	0.
DIV		0.											
DIV	13	0.90168	0.98824	0.77014	0.67625	0.48615	0.31250	0.20476	0.82620	0.59057	0.61633	0.41228	0.
DIV		0.											
DIV	14	0.93973	0.89412	0.89430	0.29819	0.63628	0.53125	0.19714	0.81612	0.56226	0.86939	0.45614	0.
DIV		0.											
DIV	15	0.87387	0.75765	0.82966	0.48136	0.61305	0.59375	0.33381	0.81948	0.51887	0.79592	0.42105	0.
DIV		0.											
DIV	16	0.83137	0.94118	0.93689	0.30990	0.69884	0.62500	0.23571	0.82284	0.68302	0.68163	0.48246	0.
DIV		0.											
DIV	17	0.89666	0.37176	0.78399	0.23642	0.52994	0.53125	0.33619	0.96390	0.65849	0.65714	0.68421	0.
DIV		0.											
DIV	18	0.93529	0.76471	0.71678	0.44409	0.85523	0.53125	0.21952	0.74391	0.62264	0.52653	0.79825	0.
DIV		0.											
DIV	19	0.84180	0.77647	0.64084	0.89563	0.43968	0.59375	0.49190	0.78421	0.36038	0.44898	0.21053	0.
DIV		0.											
DIV	20	0.89840	0.70118	0.79425	0.36315	0.77569	0.53125	0.38905	0.74307	0.56604	0.49796	0.51754	0.
DIV		0.											
DIV	21	0.82287	0.89176	0.81529	0.30458	0.74531	0.56250	0.40238	0.82955	0.43396	0.68163	0.38596	0.
DIV		0.											
DIV	22	0.88082	0.75059	0.81529	0.63685	0.67382	0.53125	0.31238	0.79681	0.55660	0.28571	0.35088	0.
DIV		0.											
DIV	23	0.92177	0.58353	0.83068	0.40682	0.73727	0.25000	0.27048	0.94039	0.52830	0.34286	0.37719	0.
DIV		0.											
DIV	24	0.84508	1.00000	0.86814	0.19382	0.83110	0.56250	0.31905	0.90848	0.43208	0.48163	0.34211	0.
DIV		0.											
DIV	25	0.89801	0.72706	0.87583	0.56976	0.70063	0.53125	0.22857	0.88329	0.49245	0.21224	0.30702	0.
DIV		0.											
DIV	26	0.88951	0.62353	0.87378	0.41534	0.66756	1.00000	0.30000	0.94374	0.49057	0.43673	0.	0.
DIV		0.											
DIV	27	0.89685	0.71294	0.78091	0.42279	0.73190	0.31250	0.40000	0.87070	0.48113	0.40408	0.28947	0.
DIV		0.											
DIV	28	0.91404	0.72706	0.85582	0.28009	0.77480	0.50000	0.25857	0.94626	0.58113	0.32245	0.46491	0.
DIV		0.											
DIV	29	0.96658	0.52235	0.78810	0.57401	0.51653	0.53125	0.34857	0.85390	0.38113	0.13469	0.27193	0.
DIV		0.											
DIV	30	0.87406	0.94118	0.87532	0.24494	0.75246	0.56250	0.35952	0.93031	0.38679	0.42041	0.23684	0.
DIV		0.											
DIV	31	0.91153	0.53412	0.56183	0.35250	0.91242	0.50000	0.50095	0.81696	0.88491	0.37959	0.48246	0.
DIV		0.											
DIV	32	0.91597	0.81412	0.73628	0.36315	0.92315	0.56250	0.26524	0.82284	0.55660	0.28163	0.37719	0.
DIV		0.											
DIV	33	0.90110	0.75765	0.75526	0.38658	0.80250	0.56250	0.37905	0.85139	0.47736	0.32653	0.28947	0.
DIV		0.											
DIV	34	0.98976	0.88000	0.69779	0.19915	1.00000	0.56250	0.24381	0.75819	0.53019	0.33878	0.35965	0.
DIV		0.											
DIV	35	0.80800	0.74353	0.73474	0.51225	0.80250	0.59375	0.44857	0.74139	0.34528	0.31429	0.25439	0.
DIV		0.											
DIV	36	0.93780	0.66588	0.73320	0.52077	0.71850	0.56250	0.30571	0.90344	0.40566	0.22449	0.24561	0.
DIV		0.											
DIV	37	0.93046	0.57412	0.74192	0.59425	0.54066	0.56250	0.33286	0.92611	0.35472	0.11837	0.17544	0.
DIV		0.											
DIV	38	0.95615	0.49412	0.78912	0.48030	0.62466	0.53125	0.34429	0.87657	0.39623	0.15918	0.24561	0.
DIV		0.											
DIV	39	0.90612	0.57412	0.78143	0.58999	0.55228	0.53125	0.35143	0.91520	0.34906	0.07755	0.17544	0.
DIV		0.											
DIV	40	0.92312	0.44706	0.75936	0.28009	0.89723	0.43750	0.32810	0.94962	0.48302	0.38367	0.22807	0.
DIV		0.											
DIV	41	0.96620	0.52471	0.77219	0.40149	0.65862	0.53125	0.33381	0.85390	0.38679	0.13469	0.23684	0.
DIV		0.											
DIV	42	0.96311	0.57176	0.77527	0.38978	0.69884	0.53125	0.28571	0.86818	0.38679	0.10612	0.23684	0.
DIV		0.											
DIV	43	0.93278	0.60235	0.79733	0.34824	0.70420	0.53125	0.36667	0.85726	0.40943	0.11429	0.23684	0.
DIV		0.											
DIV	44	0.97354	0.76706	0.71370	0.19169	0.90170	0.56250	0.31286	0.89421	0.47547	0.28163	0.26316	0.
DIV		0.											
DIV	45	0.88410	0.58118	0.67522	0.31629	0.82842	0.53125	0.55429	0.85894	0.35472	0.11837	0.21053	0.
DIV		0.											

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DIV 46  0.87193  0.71529  0.69215  0.38339  0.82842  0.56250  0.47714  0.89001  0.42264  0.32653  0.22807  0.       0.
DIV      0.
DIV 47  0.95461  0.56941  0.60698  0.40788  0.72207  0.43750  0.57333  0.77918  0.44340  0.24082  0.34211  0.       0.
DIV      0.
DIV 48  0.95982  0.61176  0.78297  0.33653  0.74620  0.50000  0.30952  0.90512  0.41509  0.15102  0.21930  0.       0.
DIV      0.
DIV 49  0.84914  0.55529  0.56747  0.56337  0.56926  0.59375  0.61333  0.99748  0.23774  0.23265  0.28070  0.       0.
DIV      0.
DIV 50  0.96967  0.50588  0.75526  0.35996  0.69616  0.53125  0.37524  0.82368  0.37736  0.14694  0.23684  0.       0.
DIV      0.
DIV 51  0.96967  0.56471  0.76603  0.38765  0.68543  0.53125  0.34048  0.85306  0.38679  0.12245  0.23684  0.       0.
DIV      0.
DIV 52  0.93181  0.72706  0.74295  0.38126  0.93119  0.62500  0.28810  0.84131  0.37736  0.19592  0.26316  0.       0.
DIV      0.
DIV 53  0.98126  0.45412  0.78245  0.30990  0.64611  0.50000  0.39381  0.82536  0.40566  0.11429  0.21930  0.       0.
DIV      0.
DIV 54  0.94340  0.60706  0.74859  0.29606  0.75514  0.53125  0.34524  0.91520  0.40566  0.17143  0.28947  0.       0.
DIV      0.
DIV 55  0.95944  0.54824  0.77373  0.30458  0.76586  0.50000  0.32190  0.88245  0.38868  0.13061  0.22807  0.       0.
DIV      0.
DIV 56  0.91018  0.55059  0.74448  0.46752  0.64433  0.56250  0.51143  0.86986  0.36604  0.10204  0.21930  0.       0.
DIV      0.
DIV 57  0.89608  0.50118  0.66393  0.21832  0.90795  0.53125  0.54190  0.90764  0.45849  0.37959  0.28070  0.       0.
DIV      0.
DIV 58  0.93819  0.61412  0.68445  0.31416  0.77391  0.53125  0.49571  0.86146  0.38113  0.20408  0.22807  0.       0.
DIV      0.
DIV 59  0.89453  0.72941  0.76090  0.43237  0.82752  0.59375  0.32238  0.94878  0.42453  0.08163  0.21930  0.       0.
DIV      0.
DIV 60  0.91269  0.50824  0.75423  0.41640  0.64969  0.50000  0.49810  0.85810  0.35094  0.09796  0.21930  0.       0.
DIV      0.
DIV 61  0.90979  0.54353  0.82350  0.33227  0.73905  0.59375  0.33905  1.00000  0.37736  0.07755  0.22807  0.       0.
DIV      0.
DIV 62  0.98262  0.67294  0.71524  0.19702  0.81055  0.53125  0.35000  0.93115  0.44151  0.20000  0.21930  0.       0.
DIV      0.
DIV 63  0.95364  0.58824  0.75577  0.18211  0.83914  0.50000  0.32714  0.91184  0.38679  0.16327  0.23684  0.       0.
DIV      0.
DIV 64  1.00000  0.94353  0.69472  0.07987  0.86059  0.46875  0.34905  0.88749  0.41132  0.18367  0.22807  0.       0.
DIV      0.
DIV 65  0.89685  0.53882  0.71832  0.35570  0.73012  0.53125  0.54333  0.99580  0.31887  0.20000  0.21930  0.       0.
DIV      0.
DIV 66  0.96716  0.63529  0.68343  0.20447  0.82931  0.50000  0.38143  0.89337  0.40755  0.18367  0.22807  0.       0.
DIV      0.
DIV 67  0.97199  0.72941  0.65829  0.18530  0.88740  0.31250  0.35190  0.92863  0.44906  0.16735  0.26316  0.       0.
DIV      0.
DIV 68  0.97895  0.59765  0.69523  0.14803  0.83557  0.53125  0.40333  0.92191  0.42264  0.18367  0.22807  0.       0.
DIV      0.
DIV 69  0.94785  0.58353  0.75013  0.21299  0.85076  0.53125  0.37143  0.87154  0.37925  0.12653  0.24561  0.       0.
DIV      0.
DIV 70  0.91057  0.67765  0.74756  0.22258  0.96962  0.59375  0.39762  0.84719  0.38302  0.13469  0.27193  0.       0.
DIV      0.
DIV 71  0.89222  0.50588  0.61673  0.43450  0.73190  0.53125  0.60714  0.90092  0.33774  0.15510  0.17544  0.       0.
DIV      0.
DIV 72  0.97045  0.68706  0.69061  0.12460  0.97766  0.56250  0.33524  0.86482  0.45283  0.21224  0.14912  0.       0.
DIV      0.
DIV 73  0.98281  0.60941  0.70549  0.07774  0.93119  0.62500  0.37000  0.90344  0.37736  0.21224  0.21053  0.       0.
DIV      0.
DIV 74  0.96639  0.60471  0.62083  0.22364  0.89097  0.50000  0.45571  0.88833  0.37925  0.17959  0.18421  0.       0.
DIV      0.
DIV 75  0.97296  0.54824  0.72858  0.13632  0.90259  0.43750  0.36905  0.94374  0.41509  0.22857  0.01754  0.       0.
DIV      0.
DIV 76  0.97470  0.50353  0.65418  0.08733  0.95442  0.56250  0.46095  0.87573  0.45660  0.20816  0.16667  0.       0.
DIV      0.
DIV 77  0.88159  0.55059  0.54438  0.32162  0.80608  0.56250  0.68190  0.91352  0.30566  0.18776  0.21930  0.       0.
DIV      0.
DIV 78  0.85455  0.55059  0.56491  0.35783  0.80161  0.59375  0.69857  0.86986  0.24906  0.12245  0.21930  0.       0.
DIV      0.
DIV 79  0.90014  0.50588  0.57517  0.21725  0.85880  0.53125  0.71476  0.89001  0.28679  0.22857  0.15789  0.       0.
DIV      0.
DIV 80  0.87502  0.43529  0.51873  0.39936  0.79625  0.56250  0.85095  0.75231  0.25472  0.12245  0.17544  0.       0.
DIV      0.
DIV 81  0.89956  0.39294  0.40072  0.25559  0.79625  0.40625  0.94000  0.89421  0.32075  0.13469  0.29825  0.       0.
DIV      0.
DIV 82  0.88874  0.37882  0.40841  0.27050  0.81233  0.56250  0.96143  0.88077  0.23774  0.11020  0.14912  0.       0.
DIV      0.
DIV 83  0.89820  0.40000  0.48076  0.26305  0.96425  0.34375  1.00000  0.52477  0.28679  0.08980  0.08772  0.       0.
DIV      0.
DIV 84  0.90168  0.44941  0.67470  0.50160  0.68097  0.53125  0.52952  0.81276  0.40566  0.20000  0.19298  0.       0.
DIV      0.
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COS	1	0.90994	0.97274	0.97647	0.97462	0.95792	0.98815	0.97843	0.95412
COS	2	0.98856	0.99790	0.92544	0.98857	0.98010	0.97068	0.96695	0.92845
COS	3	0.97155	0.96636	0.96912	0.96180	0.98729	0.95948	0.91401	0.95609
COS	4	0.96945	0.96876	0.95035	0.95698	0.94974	0.96774	0.97569	0.96971
COS	5	0.97271	0.96902	0.97470	0.93956	0.96000	0.93075	0.96467	0.98916
COS	6	0.98848	0.95095	0.96165	0.95921	0.97104	0.96603	0.86414	0.92547
COS	7	0.95125	0.95827	0.88710	0.91357	0.93365	0.94966	0.97311	0.92801
COS	8	0.92058	0.94593	0.97237	0.97161	0.93702	0.93912	0.94043	0.94451
COS	9	0.97864	0.94041	0.90083	0.96821	0.95475	0.94741	0.95102	0.95978
COS	10	0.95327	0.89351	0.97974	0.94900	0.90858	0.95429	0.93015	0.94099
COS	11	0.94662	0.95845	0.95932	0.95104	0.97183	0.92667	0.98836	0.97640
COS	12	0.96129	0.94691	0.97048	0.93108	0.95734	0.96132	0.96834	0.96841
COS	13	0.97182	0.98596	0.94928	0.99056	0.97763	0.94610	0.95722	0.97463
COS	14	0.99161	0.93129	0.93215	0.94679	0.95691	0.96316	0.94586	0.95714
COS	15	0.92101	0.98466	0.97592	0.96294	0.94598	0.96865	0.99240	0.98751
COS	16	0.94859	0.89054	0.93580	0.94417	0.94803	0.92993	0.95117	0.95589
COS	17	0.95101	0.95474	0.96096	0.93827	0.92117	0.95650	0.96312	0.95572
COS	18	0.94380	0.91302	0.94954	0.94077	0.95114	0.92713	0.93055	0.92500
COS	19	0.97965	0.95433	0.95703	0.93013	0.95419	0.96512	0.96758	0.97380
COS	20	0.95971	0.83969	0.95393	0.92977	0.91671	0.91689	0.95964	0.94302
COS	21	0.89067	0.93763	0.90925	0.82598	0.91669	0.95741	0.91511	0.95201
COS	22	0.91949	0.88210	0.90828	0.92762	0.91263	0.94143	0.94753	0.95639
COS	23	0.93460	0.94577	0.93584	0.97784	0.96900	0.95955	0.94832	0.95968
COS	24	0.97660	0.98376	0.98544	0.96702	0.98777	0.93375	0.89499	0.92202
COS	25	0.92336	0.93209	0.93669	0.93672	0.95795	0.91095	0.97844	0.95725
COS	26	0.93866	0.92806	0.96296	0.98801	0.98997	0.98944	0.94743	0.96587
COS	27	0.93621	0.98700	0.89104	0.92991	0.93942	0.93862	0.94830	0.94741
COS	28	0.93312	0.91432	0.96088	0.95102	0.90833	0.95239	0.97153	0.95059
COS	29	0.96875	0.96676	0.93153	0.96496	0.96836	0.98089	0.96555	0.88007
COS	30	0.88480	0.90200	0.91275	0.92309	0.91059	0.91586	0.90562	0.94480
COS	31	0.94027	0.92801	0.95405	0.95729	0.95247	0.95871	0.95850	0.95348
COS	32	0.96152	0.92135	0.97800	0.96104	0.97780	0.86000	0.88685	0.88829
COS	33	0.89868	0.90816	0.90540	0.92166	0.87150	0.95616	0.93629	0.92389
COS	34	0.90616	0.94949	0.97348	0.96823	0.98308	0.92740	0.95693	0.91433
COS	35	0.97895	0.99103	0.96400	0.96389	0.87009	0.91066	0.91739	0.92007
COS	36	0.93099	0.93508	0.92018	0.90219	0.94677	0.93966	0.89901	0.94146
COS	37	0.96040	0.94422	0.95868	0.96095	0.92641	0.95564	0.95408	0.97391
COS	38	0.95999	0.99595	0.98196	0.96733	0.83831	0.88197	0.88615	0.91029
COS	39	0.90974	0.92733	0.92968	0.90134	0.91073	0.93612	0.87154	0.91143
COS	40	0.90265	0.92811	0.94752	0.94138	0.90758	0.89952	0.93223	0.94078
COS	41	0.94625	0.95267	0.92428	0.94622	0.95815	0.87081	0.90061	0.90655
COS	42	0.91681	0.92514	0.91936	0.92886	0.89991	0.95538	0.94476	0.92128
COS	43	0.95062	0.96767	0.96252	0.97184	0.96795	0.94308	0.96024	0.94642
COS	44	0.98480	0.97927	0.98445	0.99284	0.97823	0.98340	0.93881	0.89537
COS	45	0.88557	0.91081	0.91902	0.93101	0.91543	0.92065	0.90487	0.95497
COS	46	0.94958	0.94297	0.93694	0.95165	0.96426	0.96542	0.97852	0.96015
COS	47	0.97507	0.91529	0.98869	0.97520	0.98025	0.98881	0.98378	0.98477

COS	48	0.94539	0.98613	0.85107	0.89630	0.90600	0.90595	0.91489	0.93082
COS	49	0.91429	0.90625	0.92100	0.91981	0.86812	0.92728	0.93682	0.91541
COS	50	0.94140	0.92811	0.92307	0.92952	0.95948	0.95639	0.93546	0.98391
COS	51	0.96911	0.93721	0.98782	0.95406	0.97007	0.96553	0.84509	0.88878
COS	52	0.88427	0.89636	0.90482	0.91082	0.92381	0.87224	0.94813	0.93313
COS	53	0.90832	0.90991	0.94978	0.96677	0.96695	0.97586	0.92316	0.94486
COS	54	0.92955	0.97508	0.98768	0.96993	0.96722	0.99699	0.97499	0.95913
COS	55	0.98275	0.98264	0.95361	0.89976	0.84505	0.90046	0.91317	0.92182
COS	56	0.87683	0.89084	0.89828	0.92626	0.94072	0.93766	0.93870	0.91523
COS	57	0.92518	0.93975	0.94417	0.95112	0.96346	0.89538	0.97458	0.94215
COS	58	0.95442	0.95923	0.93558	0.94352	0.91078	0.96065	0.96594	0.92983
COS	59	0.93130	0.87405	0.87938	0.90115	0.90786	0.91927	0.90334	0.90524
COS	60	0.88475	0.95002	0.94230	0.92439	0.92615	0.94695	0.95366	0.95832
COS	61	0.97142	0.93021	0.97380	0.92425	0.98612	0.97344	0.98333	0.97696
COS	62	0.98388	0.98484	0.94833	0.98281	0.99138	0.96041	0.98206	0.96825
COS	63	0.86844	0.89315	0.90550	0.91427	0.92318	0.91965	0.92480	0.89793
COS	64	0.95226	0.94547	0.91656	0.93287	0.95273	0.95829	0.96940	0.97196
COS	65	0.93734	0.96408	0.94677	0.98788	0.98162	0.98819	0.98040	0.98630
COS	66	0.98889	0.96423	0.99111	0.99026	0.97456	0.99012	0.96474	0.99503
COS	67	0.86121	0.85363	0.87860	0.89068	0.90115	0.87652	0.88925	0.86326
COS	68	0.94090	0.93550	0.92789	0.90669	0.93004	0.95295	0.94790	0.96652
COS	69	0.91731	0.96647	0.89501	0.97871	0.97103	0.96238	0.96247	0.98468
COS	70	0.96496	0.93512	0.97130	0.98254	0.93536	0.97921	0.95868	0.99445
COS	71	0.98614	0.84991	0.89918	0.90152	0.90487	0.91373	0.92129	0.92136
COS	72	0.89550	0.94637	0.92980	0.88770	0.91637	0.94476	0.94252	0.96356
COS	73	0.95719	0.91253	0.95169	0.96288	0.97839	0.97525	0.98614	0.96320
COS	74	0.97466	0.98332	0.96116	0.98172	0.97155	0.97201	0.98088	0.94725
COS	75	0.98430	0.99333	0.97151	0.84996	0.89693	0.90219	0.90559	0.91359
COS	76	0.92693	0.91973	0.89549	0.93768	0.93055	0.88509	0.92989	0.94896
COS	77	0.93830	0.95695	0.95136	0.92557	0.94947	0.95854	0.97262	0.96148
COS	78	0.99073	0.97873	0.96733	0.99497	0.96633	0.98451	0.98145	0.99058
COS	79	0.97740	0.94863	0.98540	0.99313	0.96868	0.98917	0.82172	0.88980
COS	80	0.88843	0.88886	0.89636	0.92419	0.90688	0.88391	0.90959	0.90606
COS	81	0.84446	0.91594	0.93261	0.90737	0.93479	0.92139	0.90605	0.91578
COS	82	0.96261	0.94613	0.93245	0.98077	0.96256	0.93794	0.98691	0.96105
COS	83	0.96695	0.95990	0.99691	0.95628	0.92084	0.95907	0.97436	0.93369
COS	84	0.97337	0.99251	0.85023	0.87943	0.89462	0.90223	0.91125	0.91920
COS	85	0.91123	0.90717	0.92036	0.92559	0.88283	0.92984	0.93067	0.92255
COS	86	0.94484	0.93560	0.93145	0.93570	0.94724	0.96458	0.94470	0.98304
COS	87	0.97749	0.94958	0.98949	0.96212	0.97732	0.97574	0.99692	0.96372
COS	88	0.94353	0.97156	0.98337	0.95133	0.97753	0.99448	0.99463	0.81512
COS	89	0.88181	0.88084	0.88182	0.89131	0.91613	0.89751	0.87861	0.90386
COS	90	0.90004	0.84119	0.91213	0.92879	0.90161	0.92917	0.91790	0.90075
COS	91	0.91215	0.95849	0.94409	0.92914	0.98017	0.96316	0.93682	0.98719
COS	92	0.95622	0.96693	0.95938	0.99668	0.95552	0.91822	0.95805	0.97326
COS	93	0.93179	0.97301	0.99119	0.99930	0.99455	0.85375	0.84346	0.86838
COS	94	0.89348	0.89980	0.88663	0.90588	0.90366	0.92039	0.93492	0.91898

COS	95	0.93596	0.91688	0.93991	0.95011	0.94640	0.94740	0.94434	0.90361
COS	96	0.97214	0.95883	0.96097	0.98434	0.96254	0.96847	0.95036	0.98179
COS	97	0.98100	0.95908	0.96725	0.96479	0.97675	0.98238	0.96929	0.96692
COS	98	0.97727	0.95711	0.97683	0.95599	0.84408	0.86679	0.88449	0.89406
COS	99	0.90403	0.90733	0.90246	0.89665	0.91752	0.92364	0.88644	0.92240
COS	100	0.92582	0.92368	0.94167	0.93768	0.92831	0.93711	0.93737	0.96628
COS	101	0.94739	0.98047	0.97736	0.95676	0.98855	0.96218	0.97795	0.97952
COS	102	0.99317	0.96948	0.94564	0.97720	0.98666	0.96149	0.97868	0.99461
COS	103	0.99127	0.99871	0.99138	0.97983	0.83728	0.86182	0.87803	0.88693
COS	104	0.89793	0.90100	0.89450	0.88547	0.91561	0.91934	0.88396	0.91693
COS	105	0.92547	0.92276	0.93770	0.93846	0.92159	0.93804	0.93147	0.96467
COS	106	0.94668	0.98017	0.97734	0.96049	0.99015	0.96029	0.97710	0.98152
COS	107	0.99004	0.97190	0.94310	0.98110	0.98747	0.96682	0.97838	0.99505
COS	108	0.98951	0.99654	0.98988	0.97915	0.99909	0.83794	0.85804	0.87581
COS	109	0.88657	0.89861	0.89668	0.89409	0.88393	0.91672	0.92063	0.88962
COS	110	0.91560	0.92494	0.92563	0.94036	0.94332	0.92386	0.93836	0.93124
COS	111	0.96905	0.95310	0.98017	0.97720	0.96647	0.98845	0.96085	0.98038
COS	112	0.98357	0.98746	0.97727	0.94854	0.98278	0.99054	0.96964	0.98195
COS	113	0.99345	0.98644	0.99493	0.98759	0.98006	0.99821	0.99854	0.84282
COS	114	0.84788	0.86749	0.88284	0.89237	0.88097	0.89457	0.86656	0.92892
COS	115	0.92894	0.91330	0.90883	0.92607	0.94713	0.94833	0.96057	0.92637
COS	116	0.95305	0.90677	0.97646	0.97067	0.96693	0.97241	0.98569	0.97394
COS	117	0.95416	0.97970	0.98785	0.95567	0.98706	0.95925	0.99322	0.99289
COS	118	0.99374	0.97765	0.98193	0.95687	0.97131	0.95547	0.98390	0.97982
COS	119	0.98330	0.98616	0.80122	0.82119	0.83996	0.85105	0.86298	0.86205
COS	120	0.87031	0.85843	0.89349	0.89196	0.86456	0.88583	0.89703	0.90241
COS	121	0.92404	0.92154	0.90598	0.92325	0.92170	0.95981	0.94627	0.96249
COS	122	0.96108	0.95737	0.96754	0.94715	0.97240	0.96728	0.96956	0.96799
COS	123	0.95186	0.97424	0.98468	0.96413	0.98200	0.98224	0.97119	0.98140
COS	124	0.97269	0.97712	0.98622	0.98540	0.99057	0.98235	0.84260	0.87634
COS	125	0.88481	0.89486	0.90259	0.90616	0.91636	0.88579	0.93690	0.92902
COS	126	0.89630	0.91927	0.93858	0.94482	0.96140	0.95797	0.92820	0.94969
COS	127	0.94717	0.97990	0.97682	0.97976	0.97338	0.98009	0.98026	0.96357
COS	128	0.98802	0.98090	0.97078	0.98637	0.96222	0.98793	0.99714	0.97873
COS	129	0.99376	0.99057	0.97337	0.98115	0.97227	0.98309	0.98430	0.98398
COS	130	0.98834	0.99019	0.99139	0.85463	0.86498	0.88996	0.89358	0.90316
COS	131	0.89508	0.90313	0.89283	0.92782	0.92115	0.89621	0.92032	0.93028
COS	132	0.92554	0.94784	0.93718	0.93487	0.95089	0.94345	0.97729	0.95699
COS	133	0.97472	0.97286	0.95418	0.96990	0.93356	0.98331	0.97191	0.97496
COS	134	0.96196	0.97182	0.97523	0.98552	0.96301	0.98138	0.98186	0.96963
COS	135	0.98126	0.96916	0.97447	0.98266	0.97887	0.98342	0.97497	0.98895
COS	136	0.98859	0.83551	0.85684	0.87219	0.88495	0.89571	0.89489	0.89500
COS	137	0.88029	0.91804	0.92214	0.89244	0.91954	0.92823	0.93050	0.94184
COS	138	0.94518	0.92530	0.94015	0.92633	0.96873	0.95481	0.97845	0.98183
COS	139	0.96938	0.98847	0.95978	0.98295	0.98593	0.98404	0.97913	0.94914
COS	140	0.98507	0.99108	0.97388	0.97952	0.99397	0.98431	0.99339	0.98477
COS	141	0.98542	0.99722	0.99857	0.99868	0.98979	0.98824	0.98855	0.98080

COS	142	0.80127	0.87359	0.86954	0.86042	0.86605	0.90884	0.90807	0.87324
COS	143	0.90122	0.87568	0.82161	0.87806	0.91111	0.89416	0.93178	0.90447
COS	144	0.90887	0.90834	0.96354	0.94134	0.93542	0.95814	0.94171	0.92880
COS	145	0.95668	0.94127	0.95704	0.94078	0.97526	0.94552	0.92271	0.94104
COS	146	0.96411	0.91690	0.97071	0.97492	0.97917	0.97456	0.97712	0.94631
COS	147	0.97053	0.96496	0.96706	0.94366	0.97430	0.97419	0.97669	0.96253
COS	148	0.84251	0.85662	0.87827	0.89013	0.90018	0.89876	0.89869	0.89642
COS	149	0.91511	0.92302	0.89011	0.91857	0.91881	0.92276	0.94061	0.93641
COS	150	0.92888	0.93754	0.93184	0.96836	0.94911	0.97668	0.97579	0.95785
COS	151	0.98406	0.96071	0.97793	0.97888	0.98908	0.96974	0.95023	0.97803
COS	152	0.98748	0.96501	0.97987	0.99237	0.98643	0.99673	0.98664	0.98289
COS	153	0.99912	0.99783	0.99815	0.98264	0.99047	0.98663	0.98626	0.99694
COS	154	0.97021	0.83952	0.86327	0.88036	0.88947	0.90009	0.90236	0.89802
COS	155	0.88920	0.91716	0.92118	0.88559	0.91831	0.92591	0.92381	0.94043
COS	156	0.93881	0.92446	0.93820	0.93580	0.96707	0.94925	0.98057	0.97702
COS	157	0.96055	0.98872	0.96087	0.97894	0.98074	0.99119	0.97249	0.94655
COS	158	0.98029	0.98859	0.96612	0.98063	0.99502	0.98995	0.99737	0.99027
COS	159	0.97971	0.99967	0.99950	0.99913	0.98319	0.98847	0.98636	0.98369
COS	160	0.99827	0.96977	0.99915	0.83456	0.85943	0.87318	0.88143	0.89224
COS	161	0.89203	0.89207	0.87424	0.92627	0.91996	0.88965	0.90356	0.92427
COS	162	0.93230	0.94364	0.94953	0.91000	0.95081	0.92645	0.97199	0.96183
COS	163	0.97733	0.96822	0.97594	0.98444	0.96004	0.97581	0.98119	0.96953
COS	164	0.98039	0.94872	0.99306	0.99330	0.98629	0.98887	0.99120	0.97197
COS	165	0.98100	0.97153	0.97859	0.98674	0.99033	0.99049	0.99270	0.98596
COS	166	0.99096	0.97560	0.99193	0.95542	0.98804	0.98948	0.83808	0.84183
COS	167	0.86850	0.88436	0.89504	0.88798	0.88911	0.89287	0.90267	0.91867
COS	168	0.88926	0.91713	0.90850	0.91423	0.93123	0.92836	0.92889	0.92673
COS	169	0.91970	0.96152	0.93926	0.96911	0.97356	0.94938	0.97790	0.95519
COS	170	0.97302	0.97513	0.98693	0.96291	0.94676	0.96954	0.98051	0.95615
COS	171	0.96947	0.98572	0.98268	0.99491	0.98360	0.98041	0.99742	0.99526
COS	172	0.99630	0.97708	0.98714	0.97953	0.98260	0.99454	0.96394	0.99843
COS	173	0.99694	0.97957	0.84366	0.85574	0.87534	0.88519	0.89628	0.89535
COS	174	0.89904	0.88473	0.92274	0.92217	0.89904	0.91343	0.92571	0.93400
COS	175	0.94541	0.94894	0.93515	0.94799	0.92380	0.97406	0.95994	0.97649
COS	176	0.98080	0.97285	0.98522	0.95838	0.98246	0.98879	0.98113	0.98045
COS	177	0.95574	0.98697	0.99249	0.97710	0.98057	0.99245	0.98029	0.99140
COS	178	0.98026	0.98645	0.99577	0.99671	0.99787	0.99219	0.99073	0.99080
COS	179	0.98447	0.99863	0.96652	0.99656	0.99701	0.99249	0.99370	0.83112
COS	180	0.84248	0.86287	0.87714	0.88842	0.88474	0.88683	0.88046	0.90970
COS	181	0.91659	0.89064	0.91262	0.91577	0.92288	0.93506	0.93771	0.92450
COS	182	0.93681	0.91690	0.96607	0.94915	0.97257	0.97912	0.96420	0.98364
COS	183	0.95645	0.97871	0.98318	0.98169	0.97404	0.94878	0.98212	0.98798
COS	184	0.97183	0.97643	0.99082	0.98089	0.99262	0.98166	0.98678	0.99700
COS	185	0.99799	0.99815	0.98862	0.98995	0.98645	0.98082	0.99921	0.96093
COS	186	0.99782	0.99791	0.99110	0.99613	0.99853	0.82165	0.86058	0.87321
COS	187	0.87830	0.88895	0.89979	0.89415	0.88351	0.90482	0.90404	0.85976
COS	188	0.90568	0.91631	0.90557	0.93340	0.92364	0.91385	0.92214	0.94986

COS	189	0.95827	0.94158	0.97682	0.96430	0.94733	0.98063	0.95763	0.97281
COS	190	0.96606	0.99147	0.96311	0.94169	0.96694	0.98234	0.94692	0.98216
COS	191	0.99030	0.99153	0.99457	0.99259	0.96829	0.99433	0.99142	0.99376
COS	192	0.96919	0.99138	0.98553	0.98708	0.98919	0.98522	0.99435	0.99428
COS	193	0.97948	0.99218	0.98896	0.98883	0.84478	0.83049	0.85997	0.88003
COS	194	0.88715	0.87397	0.90013	0.89256	0.91570	0.92226	0.91034	0.91045
COS	195	0.90250	0.93176	0.94701	0.94189	0.94366	0.94245	0.90618	0.97432
COS	196	0.96341	0.95326	0.96776	0.96365	0.95490	0.94688	0.97580	0.97357
COS	197	0.95033	0.96737	0.97212	0.97415	0.98291	0.96978	0.97263	0.97057
COS	198	0.94823	0.96844	0.94688	0.99087	0.97313	0.97064	0.97655	0.98397
COS	199	0.98730	0.98901	0.98485	0.97792	0.95923	0.97965	0.97433	0.97652
COS	200	0.97629	0.98384	0.98035	0.97193	0.82836	0.84932	0.86626	0.87743
COS	201	0.88704	0.88682	0.89627	0.87769	0.91654	0.91541	0.88678	0.90681
COS	202	0.91929	0.92665	0.94389	0.94057	0.92442	0.93847	0.93319	0.97200
COS	203	0.96115	0.97224	0.97167	0.96893	0.97620	0.95685	0.98229	0.97793
COS	204	0.97658	0.97838	0.95827	0.98188	0.99214	0.97324	0.98617	0.98910
COS	205	0.97688	0.98704	0.97678	0.98333	0.99136	0.99031	0.99432	0.98924
COS	206	0.99761	0.99574	0.99246	0.99333	0.97584	0.99454	0.99311	0.98961
COS	207	0.99100	0.99551	0.99363	0.99225	0.98997	0.81598	0.85578	0.86461
COS	208	0.87041	0.88275	0.88998	0.88210	0.85909	0.91121	0.90554	0.86808
COS	209	0.90183	0.92446	0.91700	0.93282	0.93941	0.90363	0.93560	0.93326
COS	210	0.96143	0.94966	0.98032	0.96977	0.96758	0.98925	0.95983	0.97533
COS	211	0.97926	0.97962	0.97680	0.94351	0.98652	0.99027	0.97234	0.98463
COS	212	0.99435	0.98451	0.98760	0.98535	0.97362	0.99136	0.99461	0.99491
COS	213	0.98632	0.98789	0.98894	0.97536	0.99507	0.96506	0.99015	0.99358
COS	214	0.99476	0.98424	0.99383	0.99298	0.98816	0.96973	0.98980	0.81991
COS	215	0.85012	0.86551	0.87354	0.88488	0.89115	0.88872	0.88297	0.90103
COS	216	0.90268	0.86474	0.90617	0.91238	0.90509	0.93050	0.92158	0.91670
COS	217	0.92137	0.94009	0.95831	0.94017	0.97331	0.96896	0.94732	0.97891
COS	218	0.95218	0.97476	0.96803	0.99006	0.96286	0.94224	0.96638	0.98139
COS	219	0.94790	0.97878	0.98852	0.98876	0.99491	0.99046	0.97313	0.99538
COS	220	0.99249	0.99493	0.97086	0.99254	0.98451	0.98775	0.99116	0.98128
COS	221	0.99604	0.99527	0.97899	0.99523	0.99080	0.99173	0.99908	0.97496
COS	222	0.99324	0.98703	0.81596	0.83701	0.85334	0.86491	0.87690	0.88477
COS	223	0.88201	0.87365	0.89635	0.90127	0.86999	0.89761	0.90394	0.90919
COS	224	0.92599	0.92867	0.91901	0.92282	0.91624	0.95476	0.93965	0.96793
COS	225	0.96989	0.95680	0.98161	0.96188	0.96856	0.97726	0.98275	0.96914
COS	226	0.93638	0.97305	0.98172	0.95754	0.97172	0.98865	0.98462	0.99229
COS	227	0.98578	0.97905	0.99529	0.99616	0.99629	0.98021	0.98738	0.98164
COS	228	0.97212	0.99590	0.96635	0.99463	0.99562	0.98593	0.99339	0.99559
COS	229	0.99654	0.99032	0.97324	0.98907	0.99316	0.99187	0.82809	0.83744
COS	230	0.85675	0.87283	0.88268	0.87658	0.88791	0.86374	0.91403	0.91860
COS	231	0.89864	0.90596	0.91789	0.93393	0.93941	0.94776	0.92564	0.93974
COS	232	0.90863	0.96909	0.96022	0.96578	0.97446	0.97675	0.97542	0.95627
COS	233	0.97925	0.98551	0.96684	0.98307	0.95483	0.98650	0.99061	0.98323
COS	234	0.97478	0.98537	0.96829	0.98097	0.96764	0.98607	0.98834	0.99045
COS	235	0.99292	0.99706	0.98886	0.98998	0.97934	0.99552	0.95480	0.99057

COS	236	0.99080	0.99079	0.98793	0.99694	0.99525	0.97992	0.98529	0.99414
COS	237	0.98997	0.98241	0.98977	0.82224	0.82238	0.84507	0.86277	0.87432
COS	238	0.86593	0.87717	0.86556	0.90461	0.91050	0.89590	0.89901	0.90519
COS	239	0.92497	0.93086	0.93924	0.92342	0.93580	0.89628	0.96505	0.95265
COS	240	0.96049	0.97486	0.97106	0.97315	0.95038	0.97544	0.98370	0.96557
COS	241	0.97748	0.94922	0.98286	0.98627	0.97901	0.97091	0.98242	0.96557
COS	242	0.98131	0.96614	0.98825	0.98878	0.99106	0.99290	0.99404	0.98882
COS	243	0.98569	0.97592	0.99556	0.95029	0.99149	0.99087	0.99019	0.98963
COS	244	0.99686	0.99704	0.97883	0.98490	0.99227	0.98854	0.98295	0.99210
COS	245	0.99818	0.79757	0.81802	0.82851	0.84095	0.85336	0.84367	0.85863
COS	246	0.81103	0.90500	0.89468	0.88471	0.87183	0.91278	0.92871	0.92201
COS	247	0.94287	0.89150	0.92896	0.88459	0.95558	0.95706	0.94712	0.95523
COS	248	0.98186	0.95657	0.92658	0.96733	0.97340	0.93594	0.98355	0.93230
COS	249	0.98007	0.97926	0.98634	0.96189	0.96499	0.93930	0.95110	0.93944
COS	250	0.96054	0.96345	0.96919	0.97436	0.99205	0.97212	0.97672	0.96054
COS	251	0.97797	0.92610	0.96650	0.96914	0.97957	0.96173	0.97990	0.97561
COS	252	0.95431	0.96455	0.97827	0.97561	0.95685	0.96570	0.98949	0.98462
COS	253	0.80908	0.84274	0.85259	0.86216	0.87120	0.88604	0.89510	0.87597
COS	254	0.90142	0.89670	0.86366	0.89593	0.90798	0.91223	0.93585	0.92511
COS	255	0.92352	0.92086	0.93371	0.95901	0.95044	0.96399	0.96785	0.95639
COS	256	0.97061	0.95483	0.97610	0.96891	0.97842	0.96980	0.94408	0.96644
COS	257	0.98280	0.95164	0.97863	0.98541	0.98049	0.98770	0.98086	0.98023
COS	258	0.98929	0.98667	0.99025	0.97651	0.99489	0.98996	0.98661	0.98883
COS	259	0.98568	0.99140	0.98970	0.97936	0.98909	0.99117	0.98964	0.99385
COS	260	0.98585	0.99549	0.98493	0.99510	0.99075	0.98633	0.98627	0.96278
COS	261	0.82282	0.82990	0.85089	0.86616	0.87659	0.86931	0.88173	0.86196
COS	262	0.90996	0.91272	0.89454	0.90130	0.91257	0.92793	0.93551	0.94169
COS	263	0.92256	0.93916	0.90740	0.96856	0.95761	0.96390	0.97376	0.97335
COS	264	0.97284	0.95056	0.97904	0.98286	0.96597	0.97971	0.95652	0.98557
COS	265	0.98982	0.98244	0.97594	0.98443	0.96681	0.98062	0.96658	0.98678
COS	266	0.98806	0.98980	0.99259	0.99612	0.99222	0.99069	0.98298	0.99481
COS	267	0.95724	0.99128	0.99066	0.99115	0.98840	0.99672	0.99545	0.98132
COS	268	0.98807	0.99590	0.98934	0.98424	0.98906	0.99932	0.99844	0.98835
COS	269	0.98827	0.80791	0.81522	0.83326	0.84634	0.85915	0.84497	0.85894
COS	270	0.83091	0.90353	0.89708	0.89099	0.89584	0.91714	0.92263	0.92289
COS	271	0.93539	0.90998	0.93800	0.88927	0.96134	0.95034	0.95549	0.97751
COS	272	0.97071	0.96467	0.91775	0.98000	0.98006	0.94924	0.97365	0.95323
COS	273	0.98242	0.98161	0.98161	0.96288	0.97307	0.95002	0.96506	0.95106
COS	274	0.97976	0.97392	0.97795	0.98100	0.99118	0.98062	0.98091	0.97501
COS	275	0.98615	0.93808	0.97678	0.97791	0.98120	0.97372	0.98724	0.98551
COS	276	0.96457	0.97729	0.98474	0.98027	0.96954	0.97475	0.99238	0.99115
COS	277	0.99070	0.97448	0.99350	0.81978	0.81634	0.84206	0.86039	0.87067
COS	278	0.86086	0.87669	0.86086	0.90129	0.90928	0.89477	0.89534	0.90031
COS	279	0.92284	0.93000	0.93702	0.92479	0.93297	0.89596	0.96463	0.95292
COS	280	0.95581	0.96912	0.96921	0.96591	0.95033	0.97324	0.98019	0.96107
COS	281	0.97570	0.95563	0.98054	0.98546	0.97848	0.96944	0.97894	0.96145
COS	282	0.97748	0.96113	0.98666	0.98553	0.98676	0.99020	0.99424	0.99103

COS	283	0.98720	0.97977	0.99225	0.95370	0.98954	0.98789	0.98689	0.98808
COS	284	0.99507	0.99391	0.97855	0.98933	0.99420	0.98506	0.98212	0.98845
COS	285	0.99853	0.99830	0.98566	0.98754	0.99915	0.99078	0.82030	0.82041
COS	286	0.84526	0.86105	0.87352	0.86418	0.87287	0.86593	0.90197	0.90731
COS	287	0.89051	0.89457	0.90092	0.91832	0.92785	0.93525	0.91838	0.93522
COS	288	0.90077	0.96512	0.95009	0.96242	0.97092	0.96790	0.97355	0.95079
COS	289	0.97348	0.98099	0.96816	0.97497	0.95067	0.98310	0.98687	0.97810
COS	290	0.97499	0.98349	0.96776	0.98295	0.96878	0.98545	0.99022	0.99205
COS	291	0.99447	0.99269	0.99289	0.98715	0.97967	0.99539	0.95475	0.99346
COS	292	0.99245	0.99200	0.99120	0.99701	0.99737	0.98324	0.98544	0.99453
COS	293	0.99038	0.98660	0.99286	0.99711	0.99909	0.98278	0.98812	0.99825
COS	294	0.98893	0.99790	0.81570	0.81697	0.84111	0.85471	0.86833	0.85676
COS	295	0.86572	0.85603	0.90355	0.90246	0.88762	0.88263	0.89715	0.91678
COS	296	0.92611	0.93741	0.90677	0.93880	0.89826	0.96598	0.95357	0.96063
COS	297	0.96202	0.97223	0.96969	0.94768	0.96923	0.97779	0.95694	0.97601
COS	298	0.95091	0.98690	0.98746	0.98415	0.97956	0.97947	0.95795	0.97320
COS	299	0.95919	0.97938	0.98185	0.98508	0.98887	0.99346	0.99191	0.98819
COS	300	0.97617	0.98928	0.94905	0.98617	0.98540	0.99471	0.98088	0.99215
COS	301	0.99101	0.97694	0.98405	0.99179	0.98959	0.97891	0.98587	0.99352
COS	302	0.99488	0.98453	0.98208	0.99530	0.98648	0.99407	0.99713	0.79621
COS	303	0.83518	0.84737	0.85505	0.86338	0.87648	0.88209	0.86672	0.88911
COS	304	0.88695	0.84459	0.89108	0.89869	0.89292	0.92428	0.90815	0.90582
COS	305	0.91112	0.94094	0.95069	0.93705	0.96141	0.95565	0.93966	0.96337
COS	306	0.94779	0.96843	0.95421	0.97604	0.95515	0.94606	0.95955	0.97689
COS	307	0.94271	0.97818	0.98148	0.97876	0.98348	0.97895	0.97060	0.98409
COS	308	0.98025	0.98413	0.96688	0.99486	0.98686	0.98946	0.98094	0.98840
COS	309	0.98709	0.98464	0.97406	0.98388	0.98278	0.98202	0.99426	0.98123
COS	310	0.99296	0.98023	0.99389	0.98182	0.97733	0.97576	0.95154	0.99599
COS	311	0.98104	0.96560	0.97935	0.98042	0.97593	0.80702	0.80477	0.82844
COS	312	0.85240	0.86209	0.84504	0.86268	0.84250	0.89643	0.90825	0.89275
COS	313	0.88912	0.89366	0.92145	0.92344	0.93708	0.90286	0.92838	0.88260
COS	314	0.95895	0.95170	0.94888	0.95851	0.97192	0.95935	0.94881	0.96616
COS	315	0.97364	0.94285	0.97527	0.95011	0.98321	0.98284	0.98688	0.96763
COS	316	0.97163	0.94620	0.96306	0.94564	0.98191	0.97377	0.97771	0.98112
COS	317	0.99600	0.98319	0.98360	0.96689	0.98520	0.93220	0.97867	0.97765
COS	318	0.98861	0.97447	0.98668	0.98626	0.96362	0.98301	0.98624	0.98152
COS	319	0.96667	0.97756	0.99483	0.99385	0.98882	0.97330	0.99511	0.98881
COS	320	0.99494	0.99322	0.99446	0.96568	0.80878	0.79917	0.82615	0.84803
COS	321	0.85765	0.84702	0.86717	0.85269	0.89242	0.90253	0.89043	0.87695
COS	322	0.88128	0.91789	0.92208	0.93197	0.91314	0.92576	0.87785	0.95744
COS	323	0.94949	0.94222	0.95441	0.96805	0.95446	0.95130	0.96023	0.97226
COS	324	0.94549	0.97245	0.94476	0.97658	0.97930	0.97973	0.96419	0.96956
COS	325	0.94713	0.96562	0.94623	0.98176	0.97599	0.97846	0.98188	0.99304
COS	326	0.98495	0.98143	0.96722	0.98464	0.93988	0.98152	0.97902	0.98584
COS	327	0.97852	0.98849	0.98748	0.96673	0.98600	0.98753	0.97852	0.97027
COS	328	0.98174	0.99450	0.99534	0.98387	0.97866	0.99513	0.98367	0.99698
COS	329	0.99502	0.99432	0.96901	0.99688	0.80119	0.81222	0.83260	0.84888

COS	330	0.85844	0.85298	0.86870	0.84966	0.89513	0.89812	0.87684	0.88919
COS	331	0.89776	0.91251	0.92485	0.92618	0.90908	0.92753	0.90472	0.96028
COS	332	0.94937	0.95521	0.96463	0.96365	0.96289	0.94475	0.97335	0.97135
COS	333	0.95902	0.97128	0.95508	0.97901	0.98494	0.97642	0.97471	0.97951
COS	334	0.96162	0.97518	0.96136	0.98452	0.98278	0.98382	0.98731	0.99151
COS	335	0.99509	0.99018	0.98404	0.98933	0.96005	0.98768	0.98570	0.98804
COS	336	0.98405	0.99169	0.99106	0.98018	0.99030	0.99590	0.98539	0.98297
COS	337	0.98411	0.99532	0.99458	0.98319	0.98910	0.99783	0.99059	0.99719
COS	338	0.99570	0.99419	0.98597	0.99405	0.99396	0.78081	0.78912	0.80566
COS	339	0.83857	0.84592	0.83500	0.85713	0.83855	0.87450	0.89646	0.87483
COS	340	0.89451	0.88350	0.90801	0.91342	0.91784	0.89848	0.90101	0.87815
COS	341	0.94316	0.93799	0.93827	0.96167	0.95655	0.95243	0.94540	0.96609
COS	342	0.96300	0.94486	0.96632	0.93705	0.96530	0.97278	0.96529	0.95592
COS	343	0.96713	0.94954	0.96569	0.94981	0.98676	0.97408	0.97580	0.97869
COS	344	0.98494	0.98095	0.97742	0.96268	0.98420	0.93452	0.97850	0.97631
COS	345	0.97596	0.97816	0.98270	0.98594	0.96476	0.98162	0.98342	0.97433
COS	346	0.97038	0.97862	0.99046	0.99149	0.97635	0.97817	0.99100	0.98512
COS	347	0.99200	0.98901	0.98344	0.96964	0.99228	0.99026	0.99151	0.80305
COS	348	0.77929	0.81505	0.84269	0.85170	0.83026	0.85469	0.85106	0.87763
COS	349	0.89875	0.88819	0.88264	0.86850	0.90362	0.91253	0.91863	0.91153
COS	350	0.91653	0.87085	0.95259	0.93827	0.93522	0.95222	0.95329	0.94455
COS	351	0.94224	0.95781	0.96395	0.93981	0.95891	0.95611	0.96905	0.97326
COS	352	0.97103	0.95767	0.96236	0.94033	0.96186	0.93983	0.98412	0.97147
COS	353	0.97198	0.97687	0.98645	0.98632	0.97868	0.97140	0.97926	0.93791
COS	354	0.97879	0.97405	0.97732	0.97780	0.98303	0.98341	0.96546	0.99085
COS	355	0.98658	0.97109	0.97001	0.97585	0.98983	0.99088	0.97398	0.97827
COS	356	0.99214	0.98139	0.99510	0.99144	0.98962	0.97330	0.99393	0.99593
COS	357	0.99457	0.99201	0.78313	0.81173	0.82716	0.83409	0.84268	0.85389
COS	358	0.86985	0.84809	0.88144	0.87274	0.84191	0.86553	0.88163	0.88869
COS	359	0.91688	0.90369	0.90134	0.90888	0.92187	0.94779	0.93856	0.94484
COS	360	0.94302	0.94209	0.94592	0.93638	0.96002	0.94847	0.95583	0.95385
COS	361	0.94598	0.95624	0.97217	0.94615	0.97258	0.96903	0.95913	0.96742
COS	362	0.95875	0.96557	0.97115	0.96781	0.97432	0.96812	0.99410	0.98507
COS	363	0.98635	0.97139	0.98221	0.97707	0.97316	0.96985	0.97274	0.97711
COS	364	0.97364	0.98328	0.98549	0.99079	0.97148	0.98327	0.97214	0.97582
COS	365	0.97359	0.95672	0.99194	0.98065	0.96633	0.98045	0.97841	0.97764
COS	366	0.99544	0.96879	0.97390	0.98800	0.96820	0.97844	0.76956	0.80520
COS	367	0.81881	0.82258	0.83283	0.84759	0.85835	0.84068	0.87150	0.85945
COS	368	0.82469	0.85045	0.87115	0.87452	0.90636	0.89265	0.88595	0.89982
COS	369	0.92214	0.93986	0.92948	0.94206	0.93303	0.93448	0.94354	0.93308
COS	370	0.95169	0.94001	0.95576	0.94777	0.93406	0.95050	0.96719	0.93846
COS	371	0.97259	0.96642	0.95936	0.96564	0.95999	0.95568	0.96912	0.96587
COS	372	0.97245	0.96085	0.99320	0.98063	0.98220	0.96751	0.98250	0.97493
COS	373	0.97128	0.96813	0.96998	0.97294	0.97022	0.98411	0.97753	0.98755
COS	374	0.97057	0.98328	0.97058	0.96943	0.96830	0.95009	0.98943	0.97497
COS	375	0.95805	0.97422	0.97504	0.97564	0.99467	0.96224	0.96825	0.98303
COS	376	0.96007	0.97152	0.99836	0.76838	0.78437	0.80291	0.81964	0.82752

COS	377	0.83048	0.85664	0.83960	0.86637	0.86666	0.84281	0.85682	0.86221
COS	378	0.88275	0.90726	0.89470	0.89418	0.89453	0.89907	0.94003	0.93349
COS	379	0.92788	0.93583	0.93786	0.93087	0.92968	0.95355	0.94022	0.94049
COS	380	0.94941	0.93912	0.94725	0.96432	0.94264	0.96274	0.95651	0.94320
COS	381	0.95682	0.94330	0.96657	0.96260	0.95889	0.96703	0.96558	0.99067
COS	382	0.97914	0.97906	0.96508	0.96783	0.97094	0.96486	0.96260	0.96833
COS	383	0.97086	0.96902	0.97327	0.98728	0.98665	0.96075	0.97561	0.96505
COS	384	0.97330	0.97271	0.95542	0.98707	0.97883	0.96469	0.98046	0.97673
COS	385	0.97563	0.98913	0.97103	0.97677	0.98776	0.97426	0.98381	0.99677
COS	386	0.99385	0.74724	0.77445	0.79545	0.80261	0.81169	0.81806	0.83230
COS	387	0.82975	0.84013	0.83708	0.79871	0.83355	0.83765	0.83868	0.87959
COS	388	0.85571	0.86048	0.86938	0.90824	0.91644	0.89966	0.91684	0.90495
COS	389	0.89652	0.91252	0.90641	0.92815	0.90539	0.93543	0.91289	0.92144
COS	390	0.91965	0.94125	0.90650	0.95271	0.94015	0.93625	0.94460	0.93741
COS	391	0.93327	0.94659	0.93965	0.94835	0.93044	0.97842	0.95938	0.97232
COS	392	0.94048	0.96923	0.95520	0.94808	0.93985	0.95183	0.94608	0.94523
COS	393	0.96884	0.96253	0.96958	0.94140	0.96826	0.94293	0.94154	0.94072
COS	394	0.91648	0.97181	0.95009	0.92980	0.95000	0.95060	0.95075	0.98531
COS	395	0.93565	0.94224	0.96362	0.93746	0.95400	0.98940	0.99251	0.98765
COS	396	0.73194	0.73150	0.76304	0.76786	0.77798	0.77711	0.80444	0.79834
COS	397	0.81657	0.80755	0.79468	0.81120	0.81608	0.82065	0.85615	0.83457
COS	398	0.86760	0.85949	0.86663	0.90146	0.88073	0.88559	0.89894	0.87802
COS	399	0.88095	0.86058	0.91579	0.89492	0.90596	0.89055	0.92429	0.89923
COS	400	0.91915	0.88936	0.91892	0.91238	0.90416	0.91894	0.90510	0.92393
COS	401	0.92243	0.91481	0.92560	0.91594	0.96254	0.93985	0.96327	0.92021
COS	402	0.95220	0.93289	0.92432	0.91139	0.93288	0.93018	0.92621	0.94448
COS	403	0.95763	0.95365	0.91508	0.94746	0.92181	0.92894	0.92787	0.90670
COS	404	0.95841	0.93870	0.92878	0.94122	0.93496	0.93176	0.96906	0.92042
COS	405	0.92933	0.95311	0.92607	0.94663	0.98067	0.97803	0.98150	0.98586
COS	406	0.69700	0.71630	0.73995	0.74966	0.75733	0.76824	0.79414	0.78476
COS	407	0.79350	0.79212	0.76163	0.78878	0.79079	0.80108	0.84214	0.81677
COS	408	0.83927	0.83050	0.86639	0.88266	0.86867	0.87413	0.87484	0.86771
COS	409	0.87212	0.87758	0.89826	0.87618	0.90140	0.88506	0.90112	0.88726
COS	410	0.91173	0.87768	0.91832	0.90849	0.90487	0.91492	0.90527	0.91385
COS	411	0.91879	0.91103	0.92155	0.90870	0.96174	0.93619	0.95099	0.91476
COS	412	0.95274	0.92968	0.92065	0.91013	0.92862	0.92336	0.92142	0.94433
COS	413	0.95030	0.95031	0.91367	0.94520	0.92110	0.92323	0.92214	0.89809
COS	414	0.95686	0.93271	0.91302	0.93607	0.93103	0.92951	0.97010	0.91864
COS	415	0.92914	0.95001	0.92533	0.94503	0.98150	0.98231	0.98380	0.99225
COS	416	0.99292	0.68006	0.67400	0.70894	0.73020	0.74207	0.71179	0.74133
COS	417	0.75708	0.77063	0.78061	0.76326	0.78188	0.76757	0.77564	0.81099
COS	418	0.79208	0.78996	0.81265	0.82935	0.86711	0.84472	0.85207	0.85488
COS	419	0.84390	0.84408	0.82657	0.88307	0.84735	0.86325	0.85727	0.88868
COS	420	0.87092	0.88890	0.86955	0.90075	0.87478	0.86007	0.88010	0.86456
COS	421	0.89039	0.88715	0.88009	0.89423	0.88633	0.93969	0.91091	0.93390
COS	422	0.88650	0.89822	0.90238	0.89106	0.88852	0.90156	0.89145	0.89457
COS	423	0.91183	0.92699	0.92538	0.88263	0.91601	0.88020	0.89490	0.89629

COS	424	0.88099	0.91859	0.90824	0.89822	0.90880	0.90799	0.91205	0.93874
COS	425	0.90239	0.90285	0.92879	0.90649	0.92616	0.95014	0.95251	0.96009
COS	426	0.97555	0.97043	0.97280	0.83530	0.86447	0.88229	0.89211	0.89942
COS	427	0.90404	0.90416	0.90146	0.90944	0.91633	0.87006	0.92274	0.91650
COS	428	0.90864	0.94033	0.92259	0.92200	0.92600	0.95347	0.96202	0.94247
COS	429	0.97535	0.96520	0.93953	0.97477	0.95709	0.97434	0.96115	0.98673
COS	430	0.95456	0.95480	0.96449	0.98066	0.94456	0.98176	0.98714	0.98550
COS	431	0.99158	0.98524	0.97471	0.98976	0.98487	0.98698	0.96533	0.98899
COS	432	0.98586	0.99085	0.98340	0.98418	0.99131	0.98885	0.97515	0.98851
COS	433	0.98341	0.98380	0.99579	0.97864	0.99044	0.98001	0.99505	0.98185
COS	434	0.97466	0.97330	0.94289	0.99137	0.97732	0.95961	0.97472	0.97787
COS	435	0.97159	0.99554	0.96094	0.96285	0.97922	0.96451	0.96733	0.98468
COS	436	0.98343	0.97662	0.97487	0.95194	0.95102	0.92452	0.	0.

PRINCIPAL COMPONENTS ANALYSIS

THOLEIITIC - ALKALIC BASALT PROBLEM Q-MODE FACTOR ANALYSIS

PROBLEM NAME QMODFNVT 84 VARIABLES , 5 FACTORS

SYMMETRIC %CORRELATION¤ MATRIX -LOWER HALF -ELEMENT%1,1¤ TO ELEMENT % 84, 84¤

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.000														
2	0.910	1.000													
3	0.973	0.976	1.000												
4	0.975	0.958	0.988	1.000											
5	0.978	0.954	0.989	0.998	1.000										
6	0.925	0.989	0.980	0.971	0.967	1.000									
7	0.928	0.972	0.966	0.969	0.962	0.987	1.000								
8	0.959	0.914	0.956	0.969	0.969	0.950	0.957	1.000							
9	0.950	0.968	0.976	0.970	0.973	0.969	0.975	0.940	1.000						
10	0.960	0.931	0.965	0.989	0.988	0.951	0.962	0.959	0.971	1.000					
11	0.966	0.864	0.925	0.951	0.958	0.887	0.914	0.934	0.950	0.973	1.000				
12	0.928	0.921	0.946	0.972	0.972	0.937	0.939	0.940	0.945	0.979	0.940	1.000			
13	0.901	0.968	0.955	0.947	0.951	0.960	0.953	0.894	0.980	0.949	0.909	0.954	1.000		
14	0.930	0.941	0.947	0.958	0.959	0.951	0.972	0.927	0.988	0.976	0.961	0.947	0.970	1.000	
15	0.931	0.957	0.961	0.968	0.968	0.972	0.986	0.949	0.991	0.978	0.946	0.957	0.975	0.992	1.000
16	0.931	0.932	0.947	0.957	0.963	0.946	0.957	0.921	0.985	0.976	0.963	0.946	0.969	0.992	0.988
17	0.949	0.891	0.936	0.944	0.948	0.930	0.951	0.956	0.951	0.955	0.961	0.938	0.921	0.956	0.963
18	0.944	0.913	0.950	0.941	0.951	0.927	0.931	0.925	0.980	0.954	0.957	0.930	0.954	0.965	0.968
19	0.840	0.954	0.930	0.917	0.917	0.960	0.943	0.891	0.938	0.909	0.826	0.917	0.957	0.915	0.952
20	0.928	0.913	0.941	0.948	0.956	0.935	0.946	0.936	0.978	0.969	0.960	0.948	0.960	0.977	0.984
21	0.895	0.922	0.923	0.932	0.937	0.937	0.958	0.911	0.978	0.957	0.939	0.928	0.963	0.988	0.990
22	0.891	0.930	0.939	0.939	0.948	0.947	0.933	0.914	0.961	0.951	0.908	0.952	0.972	0.951	0.969
23	0.880	0.885	0.902	0.913	0.923	0.911	0.916	0.906	0.945	0.940	0.928	0.954	0.957	0.952	0.959
24	0.860	0.887	0.888	0.899	0.908	0.905	0.922	0.871	0.956	0.936	0.924	0.906	0.949	0.973	0.968
25	0.870	0.911	0.917	0.920	0.931	0.935	0.920	0.902	0.947	0.940	0.899	0.941	0.960	0.944	0.959
26	0.838	0.882	0.886	0.910	0.910	0.927	0.930	0.901	0.911	0.936	0.872	0.911	0.903	0.928	0.948
27	0.871	0.901	0.907	0.917	0.925	0.919	0.929	0.900	0.955	0.945	0.921	0.951	0.968	0.963	0.972
28	0.895	0.886	0.911	0.919	0.931	0.915	0.921	0.905	0.955	0.950	0.943	0.937	0.952	0.964	0.965
29	0.851	0.896	0.906	0.906	0.915	0.931	0.914	0.906	0.921	0.920	0.868	0.927	0.937	0.915	0.941
30	0.845	0.889	0.884	0.896	0.905	0.911	0.924	0.872	0.948	0.933	0.908	0.910	0.950	0.967	0.967
31	0.900	0.845	0.900	0.913	0.922	0.877	0.891	0.898	0.926	0.941	0.938	0.939	0.915	0.925	0.940
32	0.874	0.879	0.901	0.908	0.919	0.903	0.905	0.885	0.950	0.942	0.924	0.926	0.947	0.954	0.958
33	0.868	0.893	0.905	0.914	0.923	0.920	0.925	0.898	0.952	0.945	0.917	0.933	0.953	0.958	0.969
34	0.861	0.854	0.879	0.891	0.901	0.877	0.889	0.863	0.941	0.936	0.928	0.907	0.930	0.953	0.948
35	0.850	0.899	0.902	0.905	0.914	0.921	0.921	0.895	0.946	0.930	0.888	0.916	0.945	0.943	0.964
36	0.850	0.897	0.902	0.906	0.914	0.927	0.920	0.895	0.938	0.931	0.885	0.930	0.949	0.938	0.957
37	0.822	0.890	0.888	0.889	0.896	0.924	0.907	0.884	0.910	0.906	0.844	0.916	0.933	0.907	0.935
38	0.850	0.879	0.895	0.902	0.911	0.919	0.911	0.907	0.920	0.926	0.883	0.930	0.931	0.923	0.945
39	0.815	0.882	0.881	0.882	0.891	0.916	0.898	0.879	0.904	0.900	0.841	0.912	0.929	0.902	0.929
40	0.854	0.843	0.868	0.893	0.900	0.887	0.906	0.904	0.920	0.935	0.919	0.936	0.917	0.940	0.950
41	0.844	0.867	0.884	0.894	0.904	0.907	0.902	0.897	0.918	0.924	0.886	0.922	0.926	0.924	0.942
42	0.837	0.862	0.878	0.887	0.898	0.901	0.894	0.885	0.916	0.919	0.884	0.917	0.925	0.923	0.938
43	0.838	0.858	0.876	0.887	0.899	0.897	0.894	0.884	0.917	0.921	0.890	0.916	0.925	0.926	0.940
44	0.843	0.848	0.867	0.883	0.892	0.881	0.895	0.867	0.929	0.929	0.913	0.909	0.926	0.947	0.948
45	0.801	0.821	0.840	0.851	0.863	0.862	0.870	0.858	0.893	0.892	0.865	0.886	0.897	0.902	0.924
46	0.843	0.876	0.885	0.895	0.903	0.906	0.916	0.886	0.937	0.929	0.896	0.919	0.939	0.945	0.961
47	0.855	0.865	0.890	0.894	0.903	0.895	0.903	0.893	0.928	0.921	0.896	0.920	0.930	0.926	0.948
48	0.836	0.857	0.872	0.885	0.896	0.895	0.895	0.880	0.918	0.922	0.892	0.920	0.928	0.931	0.942
49	0.801	0.874	0.870	0.860	0.866	0.909	0.908	0.873	0.901	0.876	0.822	0.878	0.911	0.894	0.932
50	0.843	0.857	0.878	0.890	0.900	0.899	0.899	0.896	0.915	0.923	0.890	0.919	0.919	0.923	0.941
51	0.840	0.863	0.880	0.889	0.900	0.902	0.898	0.889	0.917	0.921	0.886	0.918	0.926	0.924	0.940
52	0.835	0.859	0.873	0.881	0.892	0.892	0.892	0.874	0.926	0.920	0.890	0.904	0.924	0.932	0.944
53	0.838	0.842	0.869	0.884	0.895	0.888	0.889	0.893	0.903	0.919	0.889	0.917	0.909	0.914	0.931
54	0.844	0.856	0.875	0.885	0.896	0.895	0.899	0.885	0.923	0.922	0.899	0.913	0.926	0.934	0.945
55	0.831	0.842	0.863	0.877	0.888	0.885	0.887	0.880	0.910	0.917	0.891	0.913	0.916	0.923	0.935
56	0.822	0.861	0.873	0.878	0.889	0.900	0.894	0.884	0.905	0.904	0.860	0.906	0.916	0.906	0.933
57	0.845	0.830	0.860	0.880	0.887	0.874	0.900	0.893	0.916	0.922	0.910	0.910	0.903	0.932	0.947
58	0.828	0.849	0.866	0.877	0.887	0.887	0.896	0.878	0.917	0.915	0.887	0.907	0.919	0.927	0.944
59	0.816	0.856	0.865	0.870	0.883	0.890	0.882	0.859	0.911	0.906	0.868	0.902	0.924	0.917	0.933
60	0.820	0.850	0.866	0.874	0.885	0.891	0.889	0.883	0.901	0.903	0.865	0.906	0.912	0.905	0.931
61	0.816	0.837	0.853	0.865	0.877	0.885	0.882	0.874	0.896	0.901	0.870	0.898	0.904	0.909	0.926
62	0.828	0.837	0.857	0.873	0.883	0.877	0.888	0.864	0.914	0.919	0.899	0.906	0.918	0.934	0.939
63	0.822	0.822	0.845	0.863	0.874	0.866	0.877	0.866	0.905	0.910	0.896	0.899	0.905	0.925	0.931
64	0.798	0.818	0.829	0.841	0.853	0.844	0.859	0.811	0.905	0.895	0.885	0.872	0.913	0.929	0.922
65	0.809	0.843	0.853	0.862	0.871	0.886	0.895	0.876	0.901	0.897	0.864	0.896	0.908	0.912	0.936
66	0.823	0.830	0.851	0.866	0.877	0.869	0.882	0.862	0.910	0.913	0.895	0.901	0.913	0.928	0.936
67	0.808	0.815	0.833	0.846	0.859	0.845	0.859	0.831	0.904	0.897	0.891	0.896	0.917	0.923	0.923
68	0.820	0.816	0.842	0.860	0.871	0.861	0.877	0.861	0.901	0.909	0.895	0.895	0.900	0.923	0.930
69	0.820	0.820	0.845	0.861	0.874	0.864	0.873	0.866	0.902	0.907	0.891	0.895	0.901	0.918	0.928
70	0.816	0.817	0.841	0.855	0.868	0.857	0.866	0.856	0.904	0.902	0.888	0.883	0.897	0.917	0.926
71	0.796	0.835	0.847	0.855	0.863	0.876	0.882	0.867	0.889	0.887	0.845	0.891	0.899	0.893	0.924
72	0.807	0.805	0.828	0.852	0.862	0.845	0.863	0.843	0.896	0.908	0.893	0.889	0.894	0.921	0.923
73	0.809	0.799	0.826	0.848	0.858	0.847	0.867	0.853	0.892	0.903	0.890	0.877	0.881	0.918	0.922
74	0.801	0.812	0.833	0.849	0.858	0.853	0.869	0.850	0.895	0.898	0.877	0.889	0.898	0.913	0.925
75	0.781	0.789	0.806	0.839	0.846	0.835	0.857	0.839	0.875	0.896	0.875	0.895	0.884	0.908	0.913
76	0.803	0.779	0.815	0.843	0.852	0.830	0.855	0.851	0.878	0.899	0.888	0.883	0.869	0.904	0.913
77	0.783	0.812	0.827	0.834	0.843	0.854	0.870	0.848	0.881	0.873	0.842	0.866	0.882	0.889	0.917
78	0.770	0.805	0.819	0.823	0.833	0.848	0.858	0.841	0.871	0.859	0.825	0.850	0.871	0.875	0.906
79	0.768	0.784	0.803	0.820	0.828	0.830	0.857	0.840	0.866	0.867	0.843	0.857	0.862	0.883	0.907
80	0.747	0.774	0.795	0.803	0.812	0.818	0.832	0.830	0.840	0.837	0.799	0.834	0.838	0.839	0.880
81	0.732	0.731	0.763	0.768	0.778	0.777	0.804	0.798	0.817	0.808	0.795	0.811	0.816	0.821	0.856
82	0.697	0.716	0.740	0.750	0.757	0.768	0.794	0.785	0.793	0.792	0.762	0.789	0.791	0.801	0.842
83	0.680	0.674	0.709	0.730	0.742	0.712	0.741	0.757	0.771	0.781	0.763	0.782	0.768	0.776	0.811
84	0.835	0.864	0.882	0.892	0.899	0.904	0.904	0.901	0.909	0.916	0.870	0.923	0.917	0.909	0.940

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
16	1.000														
17	0.956	1.000													
18	0.974	0.960	1.000												
19	0.919	0.882	0.908	1.000											
20	0.985	0.967	0.988	0.934	1.000										
21	0.989	0.947	0.966	0.936	0.987	1.000									
22	0.967	0.932	0.965	0.968	0.981	0.966	1.000								
23	0.959	0.953	0.962	0.921	0.978	0.961	0.978	1.000							
24	0.983	0.927	0.957	0.914	0.979	0.991	0.964	0.964	1.000						
25	0.961	0.926	0.956	0.954	0.974	0.960	0.996	0.982	0.967	1.000					
26	0.941	0.908	0.900	0.932	0.941	0.946	0.953	0.924	0.946	0.958	1.000				
27	0.968	0.943	0.960	0.946	0.985	0.979	0.984	0.993	0.978	0.983	0.939	1.000			
28	0.979	0.960	0.975	0.915	0.989	0.975	0.980	0.989	0.984	0.985	0.945	0.986	1.000		
29	0.928	0.923	0.930	0.959	0.956	0.935	0.984	0.969	0.937	0.988	0.954	0.970	0.966	1.000	
30	0.976	0.923	0.945	0.930	0.975	0.988	0.970	0.967	0.997	0.975	0.959	0.983	0.983	0.954	1.000
31	0.944	0.951	0.963	0.895	0.975	0.942	0.954	0.959	0.936	0.944	0.911	0.961	0.966	0.930	0.931
32	0.971	0.930	0.974	0.924	0.986	0.973	0.983	0.977	0.984	0.985	0.948	0.983	0.991	0.960	0.982
33	0.972	0.937	0.964	0.947	0.988	0.982	0.988	0.980	0.986	0.989	0.964	0.991	0.990	0.975	0.990
34	0.967	0.917	0.966	0.895	0.979	0.971	0.962	0.962	0.985	0.965	0.935	0.971	0.983	0.935	0.979
35	0.957	0.913	0.952	0.963	0.978	0.975	0.986	0.963	0.975	0.983	0.961	0.982	0.972	0.972	0.981
36	0.951	0.926	0.949	0.959	0.973	0.961	0.991	0.979	0.967	0.995	0.966	0.985	0.981	0.991	0.977
37	0.921	0.906	0.916	0.963	0.946	0.932	0.981	0.963	0.938	0.987	0.961	0.967	0.960	0.997	0.956
38	0.936	0.931	0.936	0.947	0.965	0.945	0.983	0.977	0.950	0.989	0.962	0.977	0.976	0.997	0.964
39	0.918	0.901	0.912	0.958	0.944	0.929	0.980	0.963	0.937	0.987	0.956	0.967	0.959	0.997	0.956
40	0.946	0.947	0.944	0.904	0.972	0.959	0.961	0.984	0.963	0.968	0.950	0.982	0.981	0.959	0.967
41	0.938	0.928	0.937	0.937	0.966	0.947	0.980	0.977	0.957	0.989	0.962	0.978	0.980	0.993	0.969
42	0.938	0.922	0.938	0.931	0.965	0.947	0.980	0.977	0.960	0.990	0.960	0.977	0.982	0.990	0.972
43	0.943	0.924	0.938	0.931	0.969	0.953	0.980	0.977	0.966	0.988	0.961	0.980	0.984	0.987	0.977
44	0.961	0.926	0.953	0.907	0.976	0.971	0.967	0.972	0.986	0.974	0.954	0.980	0.988	0.956	0.987
45	0.922	0.906	0.923	0.922	0.960	0.946	0.962	0.961	0.957	0.968	0.947	0.972	0.967	0.970	0.968
46	0.958	0.928	0.950	0.947	0.980	0.977	0.980	0.973	0.980	0.980	0.964	0.988	0.981	0.971	0.986
47	0.937	0.935	0.951	0.943	0.977	0.957	0.975	0.973	0.954	0.970	0.934	0.983	0.972	0.975	0.962
48	0.945	0.925	0.940	0.926	0.969	0.955	0.978	0.982	0.969	0.988	0.960	0.983	0.986	0.984	0.979
49	0.904	0.909	0.908	0.964	0.941	0.935	0.958	0.942	0.929	0.957	0.941	0.957	0.941	0.975	0.946
50	0.936	0.929	0.938	0.932	0.968	0.949	0.977	0.976	0.958	0.984	0.961	0.978	0.979	0.989	0.970
51	0.939	0.924	0.938	0.936	0.967	0.949	0.981	0.977	0.961	0.989	0.961	0.979	0.981	0.991	0.972
52	0.950	0.910	0.951	0.926	0.972	0.962	0.977	0.968	0.976	0.984	0.960	0.976	0.981	0.970	0.980
53	0.928	0.929	0.927	0.920	0.962	0.939	0.969	0.974	0.949	0.978	0.955	0.973	0.975	0.987	0.963
54	0.949	0.935	0.948	0.924	0.974	0.960	0.976	0.981	0.973	0.985	0.958	0.982	0.989	0.981	0.980
55	0.938	0.925	0.937	0.917	0.966	0.949	0.973	0.979	0.964	0.984	0.956	0.979	0.983	0.982	0.974
56	0.924	0.914	0.922	0.950	0.958	0.942	0.977	0.964	0.947	0.981	0.958	0.973	0.966	0.991	0.963
57	0.942	0.944	0.942	0.906	0.974	0.963	0.953	0.968	0.964	0.955	0.947	0.976	0.974	0.950	0.967
58	0.941	0.924	0.938	0.933	0.972	0.961	0.972	0.972	0.969	0.976	0.957	0.982	0.978	0.977	0.978
59	0.939	0.904	0.936	0.933	0.961	0.950	0.980	0.970	0.968	0.989	0.960	0.975	0.979	0.980	0.977
60	0.922	0.917	0.921	0.940	0.958	0.940	0.973	0.969	0.947	0.979	0.952	0.975	0.968	0.990	0.963
61	0.929	0.919	0.923	0.916	0.955	0.940	0.968	0.970	0.957	0.982	0.962	0.969	0.977	0.983	0.969
62	0.948	0.926	0.940	0.909	0.969	0.960	0.966	0.974	0.977	0.975	0.956	0.979	0.986	0.967	0.983
63	0.939	0.923	0.936	0.896	0.965	0.953	0.960	0.975	0.971	0.973	0.950	0.975	0.984	0.966	0.977
64	0.943	0.891	0.929	0.885	0.956	0.957	0.947	0.955	0.982	0.957	0.927	0.967	0.973	0.936	0.984
65	0.925	0.924	0.921	0.934	0.959	0.950	0.964	0.968	0.956	0.971	0.955	0.976	0.969	0.978	0.970
66	0.942	0.923	0.939	0.907	0.969	0.958	0.964	0.974	0.973	0.973	0.951	0.979	0.983	0.966	0.980
67	0.935	0.910	0.938	0.889	0.961	0.950	0.955	0.978	0.971	0.965	0.918	0.980	0.980	0.949	0.974
68	0.937	0.925	0.933	0.896	0.965	0.953	0.956	0.969	0.969	0.966	0.950	0.973	0.980	0.961	0.976
69	0.935	0.918	0.935	0.901	0.965	0.950	0.962	0.971	0.968	0.974	0.951	0.973	0.981	0.968	0.975
70	0.937	0.907	0.939	0.898	0.966	0.954	0.961	0.962	0.972	0.970	0.948	0.969	0.978	0.957	0.976
71	0.908	0.906	0.911	0.941	0.951	0.937	0.961	0.956	0.940	0.963	0.948	0.968	0.954	0.976	0.955
72	0.937	0.903	0.928	0.883	0.959	0.952	0.949	0.959	0.972	0.959	0.949	0.966	0.974	0.943	0.975
73	0.932	0.913	0.926	0.878	0.957	0.949	0.942	0.954	0.968	0.954	0.951	0.960	0.972	0.945	0.972
74	0.926	0.909	0.928	0.905	0.960	0.949	0.955	0.965	0.964	0.963	0.945	0.973	0.971	0.959	0.971
75	0.918	0.898	0.901	0.878	0.943	0.938	0.938	0.962	0.957	0.952	0.945	0.966	0.963	0.945	0.966
76	0.919	0.912	0.917	0.871	0.953	0.938	0.935	0.952	0.953	0.945	0.942	0.958	0.964	0.940	0.959
77	0.904	0.901	0.909	0.922	0.948	0.939	0.945	0.943	0.942	0.946	0.936	0.960	0.948	0.956	0.954
78	0.893	0.886	0.900	0.922	0.940	0.929	0.942	0.933	0.934	0.944	0.933	0.952	0.940	0.956	0.948
79	0.895	0.894	0.895	0.899	0.940	0.933	0.928	0.936	0.938	0.931	0.930	0.954	0.940	0.940	0.949
80	0.856	0.860	0.869	0.908	0.916	0.900	0.917	0.905	0.897	0.913	0.906	0.928	0.905	0.935	0.913
81	0.835	0.868	0.859	0.867	0.901	0.881	0.886	0.899	0.878	0.881	0.861	0.916	0.895	0.906	0.891
82	0.817	0.839	0.831	0.866	0.883	0.869	0.874	0.875	0.868	0.872	0.878	0.898	0.876	0.901	0.885
83	0.792	0.790	0.813	0.829	0.867	0.845	0.852	0.855	0.844	0.844	0.827	0.883	0.847	0.863	0.857
84	0.923	0.922	0.926	0.953	0.962	0.942	0.975	0.965	0.940	0.975	0.957	0.974	0.961	0.987	0.955

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
31	1.000														
32	0.968	1.000													
33	0.965	0.995	1.000												
34	0.959	0.994	0.986	1.000											
35	0.947	0.984	0.993	0.972	1.000										
36	0.949	0.985	0.993	0.969	0.989	1.000									
37	0.921	0.959	0.974	0.934	0.973	0.993	1.000								
38	0.944	0.972	0.983	0.951	0.978	0.994	0.995	1.000							
39	0.918	0.958	0.973	0.932	0.973	0.991	0.999	0.995	1.000						
40	0.965	0.977	0.982	0.969	0.967	0.977	0.957	0.977	0.956	1.000					
41	0.946	0.977	0.987	0.961	0.979	0.995	0.991	0.999	0.991	0.980	1.000				
42	0.943	0.981	0.987	0.967	0.978	0.995	0.990	0.997	0.990	0.979	0.999	1.000			
43	0.949	0.983	0.991	0.970	0.982	0.993	0.986	0.995	0.988	0.980	0.998	0.999	1.000		
44	0.959	0.993	0.993	0.994	0.978	0.982	0.957	0.971	0.955	0.984	0.980	0.983	0.986	1.000	
45	0.952	0.974	0.985	0.964	0.982	0.982	0.971	0.981	0.973	0.977	0.986	0.985	0.991	0.982	1.000
46	0.962	0.988	0.997	0.979	0.994	0.991	0.973	0.981	0.972	0.983	0.984	0.984	0.988	0.990	0.991
47	0.972	0.975	0.986	0.963	0.981	0.982	0.970	0.981	0.969	0.974	0.983	0.979	0.983	0.975	0.989
48	0.949	0.985	0.991	0.974	0.980	0.994	0.984	0.993	0.985	0.985	0.997	0.999	0.999	0.990	0.988
49	0.923	0.941	0.964	0.917	0.971	0.975	0.979	0.975	0.977	0.946	0.971	0.965	0.967	0.944	0.974
50	0.950	0.978	0.987	0.965	0.980	0.992	0.986	0.997	0.987	0.983	0.999	0.998	0.998	0.983	0.990
51	0.947	0.980	0.989	0.966	0.981	0.995	0.990	0.997	0.990	0.980	1.000	0.999	0.999	0.983	0.988
52	0.949	0.993	0.993	0.986	0.989	0.991	0.972	0.981	0.972	0.979	0.987	0.990	0.990	0.993	0.986
53	0.947	0.970	0.981	0.956	0.969	0.986	0.983	0.995	0.984	0.980	0.997	0.995	0.996	0.977	0.987
54	0.956	0.987	0.992	0.977	0.981	0.992	0.980	0.991	0.980	0.986	0.996	0.997	0.998	0.992	0.991
55	0.949	0.982	0.988	0.972	0.976	0.991	0.981	0.993	0.982	0.987	0.997	0.998	0.998	0.989	0.990
56	0.942	0.967	0.982	0.947	0.982	0.990	0.992	0.995	0.993	0.968	0.994	0.991	0.994	0.969	0.991
57	0.972	0.974	0.983	0.970	0.973	0.971	0.948	0.968	0.947	0.991	0.973	0.971	0.977	0.984	0.987
58	0.958	0.982	0.992	0.973	0.986	0.989	0.977	0.987	0.977	0.983	0.991	0.990	0.994	0.989	0.998
59	0.944	0.987	0.990	0.972	0.985	0.994	0.985	0.988	0.985	0.974	0.991	0.995	0.995	0.986	0.988
60	0.942	0.966	0.981	0.948	0.979	0.989	0.989	0.995	0.990	0.973	0.995	0.992	0.995	0.971	0.993
61	0.936	0.973	0.982	0.958	0.972	0.989	0.985	0.992	0.986	0.979	0.995	0.996	0.996	0.980	0.987
62	0.955	0.987	0.991	0.983	0.975	0.985	0.968	0.981	0.968	0.986	0.988	0.990	0.993	0.997	0.989
63	0.949	0.983	0.986	0.979	0.971	0.982	0.966	0.981	0.966	0.988	0.989	0.991	0.993	0.994	0.989
64	0.932	0.980	0.979	0.986	0.962	0.965	0.939	0.951	0.939	0.961	0.963	0.969	0.974	0.992	0.972
65	0.944	0.966	0.983	0.952	0.979	0.985	0.980	0.988	0.981	0.980	0.989	0.987	0.990	0.977	0.995
66	0.957	0.986	0.990	0.982	0.976	0.984	0.967	0.981	0.967	0.987	0.988	0.990	0.993	0.996	0.992
67	0.953	0.982	0.982	0.982	0.963	0.973	0.950	0.965	0.951	0.980	0.974	0.978	0.981	0.991	0.981
68	0.956	0.981	0.985	0.978	0.969	0.979	0.961	0.977	0.961	0.987	0.986	0.987	0.990	0.994	0.991
69	0.951	0.983	0.987	0.978	0.975	0.983	0.968	0.983	0.969	0.985	0.990	0.992	0.994	0.993	0.993
70	0.951	0.987	0.987	0.984	0.980	0.979	0.958	0.973	0.959	0.979	0.982	0.985	0.989	0.993	0.992
71	0.946	0.960	0.977	0.943	0.978	0.981	0.979	0.983	0.979	0.971	0.984	0.980	0.984	0.967	0.995
72	0.950	0.983	0.983	0.987	0.968	0.972	0.946	0.963	0.946	0.982	0.974	0.978	0.981	0.996	0.983
73	0.945	0.977	0.979	0.980	0.964	0.970	0.947	0.966	0.946	0.982	0.976	0.978	0.982	0.993	0.985
74	0.955	0.979	0.985	0.976	0.975	0.980	0.962	0.975	0.961	0.985	0.983	0.984	0.987	0.992	0.995
75	0.937	0.965	0.973	0.965	0.956	0.967	0.950	0.966	0.950	0.987	0.974	0.976	0.979	0.985	0.981
76	0.956	0.969	0.973	0.971	0.958	0.962	0.940	0.962	0.940	0.984	0.971	0.972	0.977	0.986	0.986
77	0.946	0.956	0.972	0.946	0.973	0.969	0.959	0.967	0.959	0.966	0.971	0.968	0.974	0.968	0.994
78	0.934	0.951	0.967	0.938	0.973	0.966	0.959	0.966	0.960	0.956	0.969	0.966	0.972	0.961	0.993
79	0.939	0.947	0.964	0.943	0.963	0.957	0.943	0.957	0.943	0.967	0.963	0.959	0.967	0.966	0.991
80	0.921	0.920	0.941	0.906	0.953	0.940	0.936	0.945	0.937	0.933	0.947	0.940	0.948	0.930	0.978
81	0.924	0.899	0.919	0.889	0.919	0.912	0.904	0.919	0.905	0.924	0.922	0.915	0.926	0.916	0.963
82	0.901	0.887	0.912	0.878	0.918	0.908	0.905	0.915	0.905	0.914	0.919	0.911	0.922	0.909	0.962
83	0.889	0.871	0.889	0.870	0.901	0.875	0.860	0.880	0.865	0.890	0.887	0.880	0.894	0.886	0.940
84	0.955	0.964	0.981	0.945	0.982	0.987	0.986	0.992	0.985	0.975	0.990	0.985	0.987	0.965	0.989

	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
46	1.000														
47	0.989	1.000													
48	0.989	0.981	1.000												
49	0.974	0.977	0.963	1.000											
50	0.987	0.986	0.997	0.970	1.000										
51	0.986	0.984	0.998	0.970	0.999	1.000									
52	0.991	0.976	0.992	0.955	0.988	0.989	1.000								
53	0.980	0.983	0.995	0.964	0.998	0.997	0.980	1.000							
54	0.991	0.984	0.999	0.967	0.997	0.997	0.992	0.994	1.000						
55	0.986	0.981	0.999	0.961	0.998	0.998	0.991	0.996	0.999	1.000					
56	0.986	0.987	0.989	0.985	0.994	0.994	0.979	0.992	0.989	0.989	1.000				
57	0.989	0.985	0.978	0.959	0.980	0.974	0.977	0.976	0.984	0.980	0.972	1.000			
58	0.996	0.992	0.993	0.976	0.995	0.993	0.990	0.991	0.996	0.994	0.992	0.990	1.000		
59	0.989	0.975	0.995	0.965	0.990	0.994	0.995	0.984	0.994	0.993	0.988	0.970	0.990	1.000	
60	0.985	0.988	0.991	0.981	0.996	0.995	0.979	0.995	0.991	0.992	0.999	0.975	0.993	0.987	1.000
61	0.982	0.972	0.996	0.966	0.995	0.996	0.986	0.993	0.996	0.997	0.990	0.973	0.989	0.993	0.992
62	0.990	0.979	0.996	0.955	0.991	0.991	0.991	0.988	0.997	0.995	0.980	0.985	0.994	0.990	0.982
63	0.986	0.976	0.996	0.950	0.991	0.991	0.990	0.990	0.997	0.997	0.979	0.985	0.992	0.989	0.983
64	0.977	0.961	0.978	0.926	0.966	0.969	0.980	0.962	0.980	0.976	0.954	0.965	0.978	0.976	0.957
65	0.990	0.987	0.989	0.986	0.991	0.990	0.979	0.989	0.991	0.990	0.994	0.986	0.995	0.985	0.995
66	0.991	0.983	0.995	0.957	0.991	0.991	0.991	0.988	0.997	0.995	0.981	0.988	0.996	0.989	0.984
67	0.981	0.975	0.986	0.938	0.977	0.978	0.981	0.974	0.987	0.986	0.965	0.977	0.985	0.980	0.970
68	0.987	0.980	0.992	0.954	0.990	0.988	0.987	0.988	0.995	0.994	0.979	0.989	0.994	0.985	0.982
69	0.987	0.980	0.995	0.955	0.993	0.992	0.992	0.991	0.997	0.997	0.983	0.985	0.995	0.990	0.987
70	0.988	0.976	0.989	0.949	0.986	0.985	0.995	0.981	0.992	0.991	0.977	0.984	0.992	0.990	0.979
71	0.987	0.989	0.981	0.988	0.987	0.985	0.974	0.984	0.983	0.982	0.994	0.981	0.993	0.980	0.994
72	0.984	0.967	0.985	0.932	0.979	0.978	0.989	0.974	0.987	0.986	0.964	0.983	0.986	0.982	0.967
73	0.981	0.967	0.985	0.940	0.982	0.979	0.986	0.979	0.988	0.987	0.967	0.986	0.988	0.979	0.970
74	0.990	0.984	0.989	0.960	0.988	0.986	0.988	0.984	0.992	0.991	0.980	0.990	0.996	0.985	0.983
75	0.977	0.963	0.984	0.935	0.979	0.976	0.976	0.978	0.983	0.986	0.965	0.982	0.983	0.974	0.970
76	0.979	0.971	0.979	0.938	0.979	0.974	0.977	0.978	0.983	0.983	0.965	0.991	0.987	0.971	0.970
77	0.985	0.986	0.971	0.982	0.977	0.973	0.970	0.973	0.977	0.974	0.983	0.985	0.991	0.971	0.983
78	0.981	0.982	0.968	0.982	0.975	0.971	0.968	0.970	0.973	0.970	0.984	0.978	0.988	0.971	0.983
79	0.979	0.979	0.965	0.968	0.971	0.965	0.963	0.968	0.971	0.969	0.973	0.987	0.987	0.961	0.976
80	0.959	0.972	0.940	0.969	0.955	0.948	0.940	0.952	0.946	0.945	0.969	0.963	0.970	0.941	0.968
81	0.940	0.963	0.920	0.952	0.933	0.924	0.911	0.933	0.930	0.926	0.944	0.958	0.954	0.915	0.947
82	0.936	0.951	0.915	0.953	0.930	0.921	0.910	0.929	0.923	0.921	0.944	0.950	0.950	0.914	0.945
83	0.911	0.934	0.887	0.898	0.902	0.891	0.889	0.902	0.891	0.895	0.912	0.927	0.925	0.883	0.916
84	0.986	0.991	0.983	0.984	0.991	0.989	0.975	0.989	0.983	0.984	0.996	0.979	0.990	0.980	0.995

	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
61	1.000														
62	0.990	1.000													
63	0.992	0.998	1.000												
64	0.966	0.989	0.985	1.000											
65	0.991	0.986	0.986	0.963	1.000										
66	0.989	0.999	0.998	0.988	0.988	1.000									
67	0.975	0.992	0.991	0.991	0.974	0.993	1.000								
68	0.988	0.999	0.998	0.986	0.988	0.999	0.991	1.000							
69	0.993	0.997	0.999	0.983	0.988	0.998	0.989	0.998	1.000						
70	0.986	0.994	0.995	0.985	0.982	0.995	0.986	0.994	0.997	1.000					
71	0.982	0.977	0.976	0.952	0.996	0.981	0.966	0.979	0.980	0.976	1.000				
72	0.978	0.995	0.994	0.989	0.973	0.995	0.989	0.995	0.993	0.994	0.966	1.000			
73	0.982	0.994	0.995	0.984	0.979	0.995	0.984	0.997	0.995	0.994	0.969	0.997	1.000		
74	0.984	0.995	0.995	0.983	0.989	0.998	0.991	0.997	0.996	0.994	0.986	0.994	0.994	1.000	
75	0.979	0.990	0.991	0.976	0.978	0.991	0.985	0.992	0.989	0.983	0.970	0.992	0.990	0.992	1.000
76	0.976	0.990	0.991	0.974	0.978	0.992	0.981	0.995	0.991	0.990	0.973	0.994	0.996	0.995	0.992
77	0.972	0.976	0.974	0.957	0.992	0.981	0.966	0.980	0.978	0.978	0.995	0.969	0.974	0.988	0.968
78	0.971	0.969	0.968	0.950	0.989	0.975	0.958	0.974	0.975	0.976	0.995	0.962	0.968	0.983	0.960
79	0.965	0.973	0.973	0.955	0.987	0.979	0.965	0.980	0.977	0.976	0.989	0.971	0.977	0.988	0.974
80	0.943	0.942	0.941	0.916	0.972	0.950	0.930	0.950	0.951	0.951	0.985	0.936	0.942	0.964	0.937
81	0.922	0.929	0.928	0.907	0.958	0.939	0.929	0.941	0.935	0.932	0.969	0.920	0.929	0.953	0.926
82	0.921	0.923	0.922	0.898	0.957	0.933	0.913	0.936	0.931	0.930	0.970	0.919	0.929	0.950	0.925
83	0.880	0.895	0.896	0.881	0.919	0.908	0.898	0.909	0.908	0.912	0.939	0.902	0.903	0.929	0.906
84	0.982	0.975	0.973	0.943	0.991	0.977	0.960	0.975	0.978	0.972	0.996	0.961	0.963	0.979	0.965

	76	77	78	79	80	81	82	83	84
76	1.000								
77	0.978	1.000							
78	0.972	0.998	1.000						
79	0.984	0.997	0.994	1.000					
80	0.954	0.989	0.993	0.988	1.000				
81	0.947	0.981	0.978	0.981	0.986	1.000			
82	0.945	0.982	0.982	0.984	0.992	0.993	1.000		
83	0.926	0.950	0.953	0.960	0.976	0.970	0.973	1.000	
84	0.967	0.985	0.983	0.977	0.975	0.952	0.951	0.925	1.000

FACTOR NUMBER	TEST NUMBER	FACTOR LOADING	VARIANCE %EIGENVALUE□	EIGENVECTOR	ITERATIONS REQUIRED
1	1	0.87756	79.23934	0.09858	6
	2	0.89289		0.10031	
	3	0.91070		0.10231	
	4	0.92054		0.10341	
	5	0.92855		0.10431	
	6	0.92499		0.10391	
	7	0.93124		0.10461	
	8	0.91428		0.10271	
	9	0.95043		0.10677	
	10	0.94916		0.10663	
	11	0.92056		0.10341	
	12	0.93973		0.10557	
	13	0.94888		0.10660	
	14	0.95622		0.10742	
	15	0.97043		0.10902	
	16	0.96721		0.10866	
	17	0.95019		0.10674	
	18	0.96320		0.10820	
	19	0.94767		0.10646	
	20	0.98855		0.11105	
	21	0.97738		0.10980	
	22	0.98736		0.11092	
	23	0.98418		0.11056	
	24	0.97839		0.10991	
	25	0.98821		0.11101	
	26	0.96545		0.10846	
	27	0.99134		0.11137	
	28	0.99019		0.11124	
	29	0.98215		0.11033	
	30	0.98432		0.11058	
	31	0.96795		0.10874	
	32	0.98990		0.11120	
	33	0.99782		0.11209	
	34	0.97883		0.10996	
	35	0.98994		0.11121	
	36	0.99398		0.11166	
	37	0.97931		0.11001	
	38	0.99019		0.11124	
	39	0.97792		0.10986	
	40	0.98708		0.11089	
	41	0.99197		0.11144	
	42	0.99066		0.11129	
	43	0.99304		0.11156	
	44	0.98950		0.11116	
	45	0.98641		0.11081	
	46	0.99564		0.11185	
	47	0.99034		0.11125	
	48	0.99297		0.11155	
	49	0.97070		0.10905	
	50	0.99297		0.11155	
	51	0.99254		0.11150	
	52	0.98977		0.11119	
	53	0.98820		0.11101	
	54	0.99475		0.11175	
	55	0.99121		0.11135	
	56	0.98752		0.11094	
	57	0.98684		0.11086	
	58	0.99423		0.11169	
	59	0.98775		0.11096	
	60	0.98759		0.11094	
	61	0.98549		0.11071	
	62	0.99060		0.11128	
	63	0.98763		0.11095	
	64	0.97198		0.10919	
	65	0.98797		0.11099	
	66	0.99028		0.11125	
	67	0.97922		0.11000	
	68	0.98723		0.11090	
	69	0.98822		0.11102	
	70	0.98493		0.11065	
	71	0.98225		0.11035	
	72	0.97954		0.11004	
	73	0.97932		0.11002	
	74	0.98553		0.11071	
	75	0.97391		0.10941	
	76	0.97566		0.10960	
	77	0.97581		0.10962	
	78	0.97040		0.10901	
	79	0.96858		0.10881	
	80	0.94796		0.10649	
	81	0.92873		0.10433	
	82	0.92044		0.10340	
	83	0.89386		0.10042	
	84	0.98778		0.11097	

FACTOR NUMBER	TEST NUMBER	FACTOR LOADING	VARIANCE %EIGENVALUE□	EIGENVECTOR	ITERATIONS REQUIRED
2	1	0.42176	2.47862	0.26789	14
	2	0.38767		0.24624	
	3	0.38798		0.24644	
	4	0.36881		0.23426	
	5	0.34968		0.22211	
	6	0.32477		0.20629	
	7	0.30336		0.19269	
	8	0.29612		0.18809	
	9	0.28326		0.17992	
	10	0.27289		0.17333	
	11	0.26552		0.16865	
	12	0.24616		0.15636	
	13	0.23655		0.15025	
	14	0.23909		0.15187	
	15	0.21204		0.13469	
	16	0.20298		0.12893	
	17	0.18776		0.11926	
	18	0.17467		0.11095	
	19	0.11282		0.07166	
	20	0.10692		0.06791	
	21	0.11610		0.07374	
	22	0.08405		0.05338	
	23	0.04185		0.02659	
	24	0.03992		0.02536	
	25	0.04345		0.02760	
	26	0.02923		0.01856	
	27	0.02906		0.01846	
	28	0.04674		0.02969	
	29	-0.00338		-0.00214	
	30	0.00936		0.00594	
	31	0.03012		0.01913	
	32	0.00991		0.00629	
	33	-0.00142		-0.00090	
	34	-0.00581		-0.00369	
	35	-0.01161		-0.00737	
	36	-0.01629		-0.01035	
	37	-0.03563		-0.02263	
	38	-0.03332		-0.02116	
	39	-0.04984		-0.03166	
	40	-0.04190		-0.02661	
	41	-0.05656		-0.03593	
	42	-0.06370		-0.04046	
	43	-0.07346		-0.04666	
	44	-0.05812		-0.03692	
	45	-0.15869		-0.10080	
	46	-0.05242		-0.03330	
	47	-0.06163		-0.03915	
	48	-0.07050		-0.04478	
	49	-0.08539		-0.05424	
	50	-0.07427		-0.04718	
	51	-0.06696		-0.04253	
	52	-0.06479		-0.04115	
	53	-0.08566		-0.05441	
	54	-0.07102		-0.04511	
	55	-0.09129		-0.05799	
	56	-0.09533		-0.06055	
	57	-0.08565		-0.05440	
	58	-0.10452		-0.06639	
	59	-0.08875		-0.05637	
	60	-0.10692		-0.06791	
	61	-0.10595		-0.06730	
	62	-0.09430		-0.05990	
	63	-0.11216		-0.07124	
	64	-0.10870		-0.06904	
	65	-0.12496		-0.07937	
	66	-0.11327		-0.07195	
	67	-0.11830		-0.07514	
	68	-0.12597		-0.08001	
	69	-0.12479		-0.07926	
	70	-0.12884		-0.08184	
	71	-0.14852		-0.09434	
	72	-0.12758		-0.08104	
	73	-0.13848		-0.08796	
	74	-0.15536		-0.09868	
	75	-0.15865		-0.10077	
	76	-0.16449		-0.10448	
	77	-0.18149		-0.11528	
	78	-0.20008		-0.12709	
	79	-0.20923		-0.13290	
	80	-0.22954		-0.14580	
	81	-0.26095		-0.16575	
	82	-0.30303		-0.19248	
	83	-0.31306		-0.19885	
	84	-0.07608		-0.04832	

FACTOR NUMBER	TEST NUMBER	FACTOR LOADING	VARIANCE %EIGENVALUE¤	EIGENVECTOR	ITERATIONS REQUIRED
3	1	-0.06333	0.72735	-0.07426	26
	2	0.17120		0.20073	
	3	0.09463		0.11096	
	4	0.03542		0.04153	
	5	0.02063		0.02419	
	6	0.16733		0.19621	
	7	0.09626		0.11287	
	8	0.08620		0.10107	
	9	-0.02242		-0.02629	
	10	-0.06236		-0.07312	
	11	-0.22702		-0.26619	
	12	0.01003		0.01176	
	13	0.03215		0.03770	
	14	-0.10465		-0.12271	
	15	0.00673		0.00789	
	16	-0.10960		-0.12851	
	17	-0.04945		-0.05798	
	18	-0.09364		-0.10980	
	19	0.26016		0.30505	
	20	-0.05708		-0.06692	
	21	-0.06411		-0.07517	
	22	0.05903		0.06922	
	23	-0.04704		-0.05516	
	24	-0.12653		-0.14836	
	25	0.03137		0.03678	
	26	0.05296		0.06210	
	27	-0.01628		-0.01909	
	28	-0.09775		-0.11462	
	29	0.13662		0.16019	
	30	-0.07246		-0.08496	
	31	-0.07322		-0.08585	
	32	-0.09241		-0.10836	
	33	-0.02533		-0.02970	
	34	-0.16951		-0.19876	
	35	0.04941		0.05793	
	36	0.05126		0.06011	
	37	0.14650		0.17178	
	38	0.07977		0.09354	
	39	0.14435		0.16926	
	40	-0.07156		-0.08390	
	41	0.04059		0.04759	
	42	0.01527		0.01790	
	43	0.00713		0.00836	
	44	-0.11786		-0.13820	
	45	0.01833		0.02149	
	46	0.00234		0.00274	
	47	0.04758		0.05579	
	48	-0.01894		-0.02220	
	49	0.19723		0.23126	
	50	0.02673		0.03135	
	51	0.02764		0.03240	
	52	-0.04332		-0.05080	
	53	0.02258		0.02647	
	54	-0.02784		-0.03265	
	55	-0.02435		-0.02855	
	56	0.10850		0.12723	
	57	-0.05153		-0.06043	
	58	0.00724		0.00849	
	59	0.00330		0.00387	
	60	0.08701		0.10203	
	61	0.01063		0.01247	
	62	-0.07844		-0.09197	
	63	-0.08648		-0.10140	
	64	-0.15216		-0.17842	
	65	0.05964		0.06994	
	66	-0.07173		-0.08411	
	67	-0.12367		-0.14501	
	68	-0.08302		-0.09735	
	69	-0.06572		-0.07706	
	70	-0.08454		-0.09913	
	71	0.10684		0.12527	
	72	-0.13738		-0.16109	
	73	-0.11997		-0.14067	
	74	-0.05308		-0.06224	
	75	-0.10115		-0.11861	
	76	-0.10893		-0.12773	
	77	0.06340		0.07434	
	78	0.09120		0.10694	
	79	0.02362		0.02770	
	80	0.14531		0.17038	
	81	0.09049		0.10610	
	82	0.12951		0.15186	
	83	0.06388		0.07491	
	84	0.11878		0.13927	

FACTOR NUMBER	TEST NUMBER	FACTOR LOADING	VARIANCE %EIGENVALUE□	EIGENVECTOR	ITERATIONS REQUIRED
4	1	-0.15647	0.54935	-0.21111	20
	2	0.08268		0.11156	
	3	-0.03805		-0.05133	
	4	-0.06148		-0.08295	
	5	-0.05280		-0.07123	
	6	0.05599		0.07554	
	7	-0.03825		-0.05161	
	8	-0.15123		-0.20404	
	9	-0.01679		-0.02266	
	10	-0.05678		-0.07661	
	11	-0.14544		-0.19623	
	12	-0.03108		-0.04194	
	13	0.09049		0.12209	
	14	-0.00080		-0.00108	
	15	-0.03377		-0.04556	
	16	0.01570		0.02118	
	17	-0.13886		-0.18735	
	18	-0.05386		-0.07267	
	19	0.05178		0.06986	
	20	-0.06410		-0.08648	
	21	-0.02098		-0.02830	
	22	0.06893		0.09299	
	23	0.02946		0.03975	
	24	0.06025		0.08129	
	25	0.12252		0.16530	
	26	0.07685		0.10368	
	27	0.01077		0.01454	
	28	0.03722		0.05022	
	29	0.08310		0.11212	
	30	0.08026		0.10828	
	31	-0.16070		-0.21681	
	32	0.04277		0.05770	
	33	0.02740		0.03697	
	34	0.02520		0.03401	
	35	0.02167		0.02924	
	36	0.08573		0.11566	
	37	0.12217		0.16483	
	38	0.06088		0.08214	
	39	0.12687		0.17118	
	40	-0.02852		-0.03847	
	41	0.06345		0.08560	
	42	0.09125		0.12311	
	43	0.06467		0.08726	
	44	0.03551		0.04791	
	45	-0.01804		-0.02433	
	46	-0.00151		-0.00204	
	47	-0.07995		-0.10787	
	48	0.07782		0.10500	
	49	-0.01214		-0.01638	
	50	0.03198		0.04314	
	51	0.06716		0.09062	
	52	0.07169		0.09672	
	53	0.02367		0.03193	
	54	0.04604		0.06212	
	55	0.05870		0.07919	
	56	0.02848		0.03843	
	57	-0.10797		-0.14567	
	58	-0.00830		-0.01120	
	59	0.11036		0.14890	
	60	0.02089		0.02818	
	61	0.08589		0.11589	
	62	0.04255		0.05740	
	63	0.04173		0.05631	
	64	0.07790		0.10510	
	65	-0.00324		-0.00437	
	66	0.02213		0.02986	
	67	0.03784		0.05105	
	68	0.00485		0.00655	
	69	0.02971		0.04009	
	70	0.02280		0.03076	
	71	-0.03418		-0.04612	
	72	0.02586		0.03488	
	73	0.00473		0.00638	
	74	-0.00903		-0.01219	
	75	0.02680		0.03615	
	76	-0.05663		-0.07641	
	77	-0.07990		-0.10780	
	78	-0.06653		-0.08977	
	79	-0.11010		-0.14855	
	80	-0.15213		-0.20525	
	81	-0.22433		-0.30266	
	82	-0.19763		-0.26664	
	83	-0.25505		-0.34411	
	84	-0.03348		-0.04517	

FACTOR NUMBER	TEST NUMBER	FACTOR LOADING	VARIANCE %EIGENVALUE□	EIGENVECTOR	ITERATIONS REQUIRED
5	1	0.10868	0.35204	0.18316	20
	2	-0.12329		-0.20780	
	3	0.00803		0.01354	
	4	0.05877		0.09905	
	5	0.06784		0.11434	
	6	-0.02828		-0.04766	
	7	-0.07200		-0.12136	
	8	0.15152		0.25537	
	9	-0.10769		-0.18150	
	10	0.05290		0.08916	
	11	0.07503		0.12646	
	12	0.10930		0.18422	
	13	-0.11533		-0.19437	
	14	-0.09803		-0.16521	
	15	-0.08571		-0.14446	
	16	-0.07713		-0.13000	
	17	0.08951		0.15086	
	18	-0.02908		-0.04902	
	19	-0.12032		-0.20279	
	20	-0.02978		-0.05020	
	21	-0.14725		-0.24817	
	22	-0.00294		-0.00495	
	23	0.05017		0.08456	
	24	-0.13010		-0.21928	
	25	0.02905		0.04897	
	26	0.02184		0.03680	
	27	-0.04292		-0.07233	
	28	0.02129		0.03589	
	29	0.08466		0.14269	
	30	-0.11076		-0.18668	
	31	0.04048		0.06822	
	32	-0.03163		-0.05331	
	33	-0.04347		-0.07327	
	34	-0.06361		-0.10721	
	35	-0.08665		-0.14604	
	36	0.00631		0.01064	
	37	0.05180		0.08730	
	38	0.08862		0.14935	
	39	0.05791		0.09761	
	40	0.06091		0.10265	
	41	0.07898		0.13311	
	42	0.07125		0.12008	
	43	0.05073		0.08551	
	44	-0.03115		-0.05250	
	45	-0.00862		-0.01452	
	46	-0.06594		-0.11114	
	47	-0.01262		-0.02126	
	48	0.04830		0.08141	
	49	-0.05545		-0.09346	
	50	0.07278		0.12266	
	51	0.06335		0.10676	
	52	-0.01765		-0.02975	
	53	0.10875		0.18329	
	54	0.03437		0.05793	
	55	0.06733		0.11347	
	56	0.03565		0.06009	
	57	-0.00600		-0.01011	
	58	-0.01194		-0.02012	
	59	0.00494		0.00833	
	60	0.05263		0.08870	
	61	0.07819		0.13178	
	62	0.00764		0.01288	
	63	0.03986		0.06719	
	64	-0.09022		-0.15206	
	65	0.00314		0.00529	
	66	0.00517		0.00872	
	67	-0.02303		-0.03882	
	68	0.02267		0.03822	
	69	0.03884		0.06547	
	70	-0.00693		-0.01168	
	71	-0.00327		-0.00551	
	72	-0.00855		-0.01441	
	73	0.01079		0.01818	
	74	-0.01139		-0.01919	
	75	0.03238		0.05458	
	76	0.03704		0.06244	
	77	-0.05444		-0.09176	
	78	-0.05548		-0.09351	
	79	-0.04902		-0.08262	
	80	-0.04206		-0.07089	
	81	-0.04369		-0.07363	
	82	-0.05137		-0.08659	
	83	-0.05828		-0.09823	
	84	0.04419		0.07448	

PRINT OUT OF RESIDUAL MATRIX -LOWER HALF -ELEMENT% 1, 1□ TO ELEMENT % 84, 84□

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.012														
2	0.000	0.001													
3	0.009	0.001	0.010												
4	-0.003	-0.001	0.001	0.008											
5	0.002	-0.001	0.003	0.006	0.008										
6	-0.001	-0.000	-0.002	-0.001	-0.004	0.007									
7	-0.009	0.000	-0.009	-0.002	-0.008	0.011	0.025								
8	-0.002	-0.001	-0.007	-0.003	-0.004	0.007	0.013	0.023							
9	0.004	0.001	0.003	-0.004	-0.002	-0.000	-0.003	0.002	0.004						
10	-0.007	-0.001	-0.002	0.010	0.006	-0.001	0.003	-0.001	-0.005	0.015					
11	0.001	-0.001	-0.001	0.001	0.003	-0.002	-0.003	-0.000	0.000	0.001	0.004				
12	-0.017	0.000	-0.008	0.008	0.004	-0.009	-0.005	-0.014	-0.007	0.013	-0.000	0.043			
13	-0.003	0.002	0.000	-0.002	-0.001	-0.008	-0.010	-0.016	0.001	-0.003	0.001	0.019	0.021		
14	-0.006	0.000	-0.006	-0.001	-0.003	0.004	0.012	0.005	-0.001	0.002	0.001	0.001	-0.001	0.008	
15	-0.006	-0.000	-0.006	-0.000	-0.003	0.004	0.010	0.007	-0.001	0.002	-0.000	0.001	-0.003	0.005	0.005
16	0.001	-0.002	-0.001	0.001	0.002	0.001	0.000	0.000	-0.003	0.001	0.002	-0.003	-0.004	-0.000	0.001
17	0.001	0.000	-0.004	-0.012	-0.012	0.009	0.015	0.001	-0.001	-0.014	-0.002	-0.014	-0.000	0.007	0.005
18	0.014	0.002	0.012	-0.009	-0.003	-0.003	-0.015	-0.003	0.009	-0.015	-0.003	-0.016	0.003	-0.010	-0.008
19	-0.002	0.000	0.001	0.004	0.003	-0.003	-0.005	-0.006	-0.001	0.005	-0.001	0.011	0.005	-0.003	-0.002
20	0.005	-0.000	0.003	-0.002	0.001	-0.002	-0.006	0.000	0.002	-0.004	0.001	-0.005	0.001	-0.003	-0.003
21	-0.003	-0.001	-0.005	-0.001	-0.001	0.003	0.007	0.008	-0.001	0.000	0.002	-0.003	-0.005	0.004	0.004
22	0.004	-0.000	0.005	0.001	0.005	-0.007	-0.015	-0.008	0.001	-0.001	0.001	0.006	0.006	-0.008	-0.006
23	-0.005	0.002	-0.005	-0.008	-0.006	-0.006	-0.004	-0.006	0.002	-0.009	0.001	0.015	0.018	0.001	0.000
24	0.000	-0.002	-0.003	-0.001	0.000	0.002	0.004	0.005	-0.001	-0.001	0.002	-0.006	-0.005	0.002	0.002
25	0.003	-0.000	0.002	-0.001	0.002	-0.004	-0.009	-0.003	0.001	-0.003	0.001	0.002	0.004	-0.005	-0.003
26	-0.008	-0.004	-0.007	0.012	0.005	0.012	0.021	0.014	-0.010	0.018	-0.003	-0.004	-0.027	0.006	0.009
27	-0.006	0.001	-0.005	-0.003	-0.002	-0.006	-0.004	-0.006	0.000	-0.002	0.002	0.017	0.015	0.002	0.000
28	0.004	-0.000	0.001	-0.005	-0.002	-0.001	-0.003	-0.003	0.001	-0.008	0.001	-0.005	0.003	-0.002	-0.002
29	0.003	0.001	0.002	-0.002	-0.000	-0.002	-0.003	-0.003	0.002	-0.003	0.002	-0.003	0.004	-0.000	-0.002
30	-0.003	-0.002	-0.005	0.001	0.001	0.002	0.006	0.005	-0.002	0.002	0.003	-0.002	-0.004	0.005	0.003
31	0.003	-0.000	0.008	0.001	0.003	-0.006	-0.016	-0.020	-0.002	-0.002	-0.004	0.013	0.011	-0.011	-0.007
32	0.005	0.000	0.006	0.001	0.003	-0.003	-0.011	-0.004	0.002	-0.002	-0.002	-0.001	0.001	-0.008	-0.005
33	0.001	-0.001	0.001	0.001	0.002	-0.001	-0.004	-0.001	-0.000	0.001	-0.000	0.001	-0.000	-0.002	-0.001
34	0.005	0.001	0.007	0.003	0.003	-0.002	-0.008	-0.002	0.002	0.002	-0.002	-0.002	-0.002	-0.006	-0.004
35	0.002	-0.001	0.001	0.003	0.005	-0.003	-0.007	0.006	0.001	0.002	0.000	-0.001	-0.005	-0.005	-0.002
36	0.001	0.001	0.002	-0.000	-0.001	-0.000	-0.002	-0.001	0.001	-0.001	-0.002	0.001	0.001	-0.002	-0.001
37	0.000	0.000	0.001	-0.000	-0.001	0.000	0.000	-0.003	-0.000	-0.000	-0.000	0.001	0.002	-0.000	-0.000
38	0.000	0.000	-0.000	-0.001	-0.001	-0.000	0.000	0.001	0.001	-0.001	0.000	-0.001	0.001	0.001	0.000
39	0.001	-0.000	0.000	-0.001	0.000	-0.002	-0.003	-0.003	0.000	-0.001	0.001	0.002	0.003	-0.001	-0.001
40	-0.010	0.000	-0.009	-0.003	-0.006	0.002	0.010	0.006	-0.001	0.000	-0.004	0.012	0.002	0.005	0.006
41	0.001	0.001	0.001	-0.000	-0.000	0.000	0.000	0.001	0.001	-0.001	0.001	-0.003	0.000	0.001	-0.000
42	0.002	0.001	0.002	-0.001	-0.000	-0.000	-0.002	0.000	0.002	-0.001	0.000	-0.003	-0.000	-0.001	-0.001
43	0.003	-0.000	0.001	0.000	0.002	-0.001	-0.003	-0.001	0.000	-0.000	0.002	-0.003	-0.000	-0.001	-0.001
44	0.000	0.000	0.002	0.002	0.000	0.001	0.001	-0.001	-0.000	0.002	-0.001	-0.001	-0.002	-0.001	-0.000
45	0.002	-0.001	0.001	0.000	0.002	-0.001	-0.003	0.001	0.000	-0.000	0.001	-0.002	-0.001	-0.002	-0.001
46	-0.002	-0.001	-0.001	0.001	0.001	0.000	0.000	0.001	-0.002	0.002	-0.001	0.004	-0.001	-0.001	0.001
47	0.003	0.002	0.005	-0.001	0.001	-0.005	-0.009	-0.009	0.002	-0.003	0.001	0.003	0.009	-0.003	-0.004
48	-0.000	0.000	-0.000	-0.001	-0.000	-0.001	-0.000	-0.001	0.000	-0.000	0.000	0.001	0.002	0.001	0.000
49	0.002	0.000	-0.000	-0.006	-0.006	0.005	0.007	0.001	0.001	-0.008	-0.002	-0.009	-0.001	0.002	0.001
50	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.001	-0.003	-0.001	0.001	-0.000
51	0.002	0.001	0.002	-0.000	0.001	-0.001	-0.001	-0.000	0.001	-0.000	0.001	-0.003	0.000	-0.000	-0.001
52	0.004	0.000	0.004	0.001	0.002	0.000	-0.004	0.006	0.002	0.000	-0.002	-0.006	-0.007	-0.005	-0.002
53	0.000	0.000	-0.000	0.001	0.001	-0.000	0.001	-0.000	0.000	0.001	0.003	-0.002	0.001	0.003	0.000
54	0.002	0.000	0.001	-0.003	-0.002	0.001	0.001	0.000	0.001	-0.004	-0.000	-0.006	-0.001	0.000	-0.000
55	0.000	0.000	-0.000	-0.001	-0.001	0.000	0.001	0.002	0.001	-0.001	0.000	-0.002	0.000	0.001	0.000
56	0.003	-0.001	0.001	0.000	0.002	-0.001	-0.003	-0.002	0.000	-0.001	0.002	-0.003	-0.000	-0.001	-0.001
57	-0.005	-0.000	-0.005	-0.001	-0.003	0.003	0.008	0.005	-0.002	-0.000	-0.002	0.002	-0.003	0.003	0.004
58	0.000	0.000	0.000	0.001	0.001	0.000	0.000	-0.000	-0.000	0.001	0.001	-0.001	-0.000	0.001	-0.000
59	0.004	-0.001	0.003	0.000	0.002	-0.001	-0.007	-0.002	0.000	-0.002	-0.001	-0.002	-0.001	-0.005	-0.003
60	0.001	-0.000	-0.000	-0.001	0.001	-0.002	-0.002	-0.001	0.001	-0.002	0.003	-0.002	0.002	0.001	-0.001
61	0.001	-0.001	-0.001	-0.003	-0.002	0.003	0.004	0.004	-0.000	-0.004	-0.000	-0.008	-0.005	0.001	0.002
62	-0.001	0.000	0.000	0.001	-0.001	0.002	0.004	-0.002	-0.001	0.001	-0.000	-0.000	-0.000	0.002	0.001
63	-0.000	0.000	-0.001	-0.002	-0.002	0.002	0.004	0.004	0.001	-0.001	-0.000	-0.004	-0.002	0.002	0.002
64	0.003	0.001	0.004	0.002	0.002	-0.002	-0.002	-0.007	0.000	0.001	0.002	-0.001	0.004	0.001	-0.002
65	-0.002	-0.001	-0.004	-0.004	-0.004	0.003	0.007	0.004	-0.001	-0.004	0.000	-0.003	-0.001	0.004	0.003
66	-0.000	0.001	0.001	-0.000	-0.001	0.001	0.002	-0.001	0.000	0.000	-0.000	-0.001	0.001	0.001	0.000
67	-0.001	0.002	0.001	-0.003	-0.003	-0.004	-0.005	-0.009	0.002	-0.004	0.000	0.010	0.014	-0.001	-0.002
68	-0.000	0.000	-0.000	-0.000	-0.002	0.003	0.005	0.000	-0.001	0.001	-0.000	-0.003	-0.002	0.002	0.001
69	0.002	-0.000	0.001	-0.001	-0.000	0.001	0.001	0.004	0.001	-0.001	0.000	-0.006	-0.003	0.000	0.000
70	0.005	-0.001	0.003	0.000	0.002	0.000	-0.004	0.005	0.002	-0.001	-0.000	-0.009	-0.007	-0.004	-0.002
71	-0.001	-0.000	-0.001	-0.000	-0.001	0.000	0.001	-0.001	-0.001	0.000	-0.001	0.003	0.001	0.000	0.000
72	-0.003	-0.000	-0.000	0.005	0.002	0.002	0.003	0.002	-0.002	0.007	-0.002	0.003	-0.005	0.000	0.001
73	-0.000	-0.000	-0.001	0.002	-0.001	0.006	0.010	0.008	-0.001	0.003	-0.002	-0.009	-0.011	0.003	0.003
74	-0.002	0.001	0.000	0.001	-0.001	0.001	0.002	-0.000	-0.000	0.002	-0.002	0.003	0.001	0.001	0.000
75	-0.013	0.000	-0.009	0.004	-0.002	0.002	0.011	0.003	-0.005	0.009	-0.001	0.017	0.001	0.007	0.006
76	-0.004	-0.000	-0.002	0.003	0.000	0.004	0.007	0.003	-0.002	0.006	-0.002	0.002	-0.005	0.002	0.003
77	0.001	-0.000	0.000	-0.001	-0.002	0.003	0.003	0.000	-0.000	-0.002	-0.001	-0.004	-0.002	0.000	0.001
78	0.004	-0.001	0.002	-0.001	0.000	0.002	0.000	0.003	0.001	-0.002	-0.000	-0.009	-0.006	-0.001	-0.001
79	-0.004	-0.000	-0.004	0.000	-0.002	0.003	0.008	0.005	-0.002	0.002	-0.000	-0.000	-0.004	0.004	0.004
80	0.002	-0.000	0.002	0.003	0.004	-0.001	-0.004	0.002	0.000	0.003	0.001	-0.002	-0.003	-0.002	-0.001
81	0.002	0.001	0.002	-0.005	-0.004	-0.001	-0.002	-0.009	0.001	-0.008	0.000	-0.000	0.009	-0.000	-0.002
82	-0.000	-0.000	-0.000	0.000	-0.001	0.003	0.005	-0.000	-0.001	0.001	-0.001	-0.003	-0.003	0.002	0.001
83	-0.002	0.000	0.001	0.008	0.011	-0.011	-0.016	-0.003	0.001	0.010	0.005	0.017	0.008	-0.003	-0.004
84	-0.002	-0.000	-0.001	0.002	0.002	-0.002	-0.002	-0.001	-0.001	0.003	-0.000	0.006	0.002	-0.001	-0.000

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
16	0.005														
17	0.002	0.032													
18	-0.005	0.002	0.029												
19	-0.002	-0.009	-0.001	0.004											
20	0.000	-0.001	0.007	-0.001	0.003										
21	0.002	0.004	-0.007	-0.003	-0.001	0.005									
22	-0.000	-0.010	0.008	0.004	0.004	-0.004	0.010								
23	-0.004	0.008	0.005	0.001	0.001	-0.001	0.003	0.024							
24	0.004	0.004	-0.005	-0.003	0.000	0.004	-0.002	-0.002	0.005						
25	0.000	-0.005	0.007	0.002	0.003	-0.002	0.006	0.004	-0.001	0.005					
26	0.008	-0.004	-0.026	-0.001	-0.008	0.007	-0.011	-0.028	0.005	-0.009	0.058				
27	-0.002	0.000	-0.002	0.002	0.000	-0.000	0.003	0.017	-0.001	0.003	-0.018	0.014			
28	0.002	0.009	0.007	-0.002	0.002	-0.000	0.002	0.006	0.001	0.002	-0.010	0.002	0.006		
29	-0.001	0.001	0.004	-0.001	0.001	-0.001	0.001	0.002	-0.000	0.000	-0.010	0.001	0.002	0.003	
30	0.004	0.004	-0.011	-0.003	-0.001	0.005	-0.004	-0.002	0.005	-0.002	0.009	-0.000	-0.000	-0.000	0.007
31	-0.001	-0.004	0.012	0.007	0.001	-0.010	0.012	0.005	-0.007	0.006	-0.009	0.002	0.004	-0.001	-0.010
32	-0.001	-0.008	0.011	0.003	0.003	-0.005	0.008	-0.002	-0.003	0.005	-0.005	-0.002	0.001	-0.000	-0.006
33	0.001	-0.004	0.001	0.001	0.001	-0.001	0.003	-0.001	-0.000	0.002	0.001	-0.001	-0.000	-0.001	-0.001
34	-0.003	-0.011	0.008	0.003	0.002	-0.005	0.004	-0.006	-0.004	0.002	-0.001	-0.005	-0.003	0.000	-0.006
35	0.000	-0.013	0.003	0.002	0.003	-0.000	0.005	-0.005	0.000	0.004	0.003	-0.002	-0.002	-0.002	-0.001
36	-0.002	-0.002	0.005	0.001	0.000	-0.002	0.002	0.001	-0.002	0.001	-0.002	-0.000	-0.000	-0.000	-0.003
37	-0.000	0.002	0.001	0.000	-0.000	-0.001	-0.000	0.001	-0.001	-0.000	-0.002	0.000	0.001	0.000	-0.001
38	-0.001	0.001	0.001	-0.001	0.000	0.000	-0.000	0.002	0.000	-0.000	-0.004	0.001	0.000	0.001	0.000
39	0.000	0.000	0.001	0.000	0.001	-0.000	0.002	0.003	0.000	0.001	-0.005	0.002	0.002	0.001	0.000
40	-0.003	0.004	-0.006	0.000	-0.003	0.003	-0.004	0.009	-0.001	-0.001	0.003	0.006	-0.002	-0.004	-0.000
41	-0.001	0.000	0.001	-0.001	0.000	-0.000	-0.001	-0.000	0.000	-0.001	-0.003	-0.000	-0.000	0.001	0.000
42	-0.001	-0.001	0.003	-0.000	0.001	-0.001	0.000	-0.001	-0.001	0.000	-0.004	-0.001	0.000	0.001	-0.001
43	0.001	-0.001	0.000	-0.001	0.001	0.000	0.001	-0.001	0.001	0.001	-0.002	-0.000	0.001	0.001	0.001
44	-0.001	-0.001	0.000	0.001	-0.001	-0.001	-0.001	-0.004	-0.001	-0.001	0.005	-0.003	-0.001	-0.001	-0.001
45	0.001	-0.002	0.001	-0.000	0.001	0.000	0.002	-0.001	0.001	0.002	0.000	-0.001	0.001	-0.000	0.000
46	0.001	-0.002	-0.002	0.001	-0.001	0.000	0.001	-0.001	-0.000	0.001	0.005	-0.000	-0.001	-0.002	-0.000
47	-0.003	-0.002	0.008	0.002	0.002	-0.004	0.005	0.006	-0.003	0.003	-0.017	0.004	0.002	0.003	-0.004
48	-0.001	0.001	-0.000	-0.000	0.000	0.000	-0.000	0.002	-0.000	-0.000	-0.003	0.002	0.000	0.001	0.000
49	0.000	0.016	0.004	-0.004	-0.000	0.001	-0.004	0.002	0.001	-0.002	-0.002	-0.002	0.005	0.000	-0.000
50	-0.001	-0.001	0.000	-0.001	0.000	0.000	-0.001	-0.002	0.000	-0.001	-0.001	-0.001	-0.001	0.001	0.000
51	-0.001	-0.001	0.002	-0.000	0.001	-0.001	0.000	-0.001	-0.000	-0.000	-0.003	-0.001	-0.000	0.001	-0.000
52	-0.002	-0.009	0.008	0.001	0.002	-0.002	0.003	-0.006	-0.002	0.002	0.004	-0.006	-0.002	-0.001	-0.004
53	0.000	0.001	-0.004	-0.001	-0.000	0.001	-0.002	-0.001	0.002	-0.002	-0.002	0.001	-0.000	0.002	0.003
54	0.000	0.005	0.003	-0.002	0.001	0.000	-0.001	0.000	0.001	-0.000	-0.003	-0.001	0.002	0.001	0.000
55	-0.001	0.001	0.001	-0.001	0.000	0.001	-0.001	0.001	0.000	-0.000	-0.003	0.001	-0.000	0.001	0.000
56	0.002	-0.000	0.000	-0.001	0.001	0.000	0.002	-0.001	0.002	0.001	-0.002	-0.000	0.001	0.001	0.001
57	0.000	0.005	-0.004	-0.001	-0.002	0.002	-0.003	0.001	0.001	-0.002	0.008	0.000	-0.000	-0.003	0.001
58	0.000	-0.000	-0.001	-0.000	-0.000	0.000	-0.001	-0.001	0.000	-0.001	0.001	-0.001	-0.000	0.000	0.001
59	0.001	-0.003	0.006	0.001	0.002	-0.002	0.005	-0.002	-0.001	0.003	0.000	-0.002	0.001	-0.001	-0.003
60	0.001	0.001	-0.000	-0.001	0.001	0.001	0.001	0.002	0.002	0.001	-0.006	0.002	0.002	0.002	0.002
61	0.003	0.008	-0.000	-0.004	0.000	0.003	-0.003	-0.002	0.003	-0.001	0.005	-0.003	0.003	-0.001	0.003
62	0.000	0.003	-0.003	-0.000	-0.002	-0.000	-0.003	-0.002	-0.000	-0.002	0.003	-0.001	-0.000	0.000	0.001
63	-0.000	0.004	-0.001	-0.002	-0.000	0.002	-0.003	0.000	0.001	-0.002	0.001	-0.001	0.000	0.000	0.001
64	-0.000	-0.000	-0.001	0.000	-0.000	-0.002	-0.000	-0.002	-0.000	-0.001	-0.005	-0.000	0.000	0.003	0.001
65	0.002	0.010	-0.003	-0.003	-0.001	0.004	-0.004	0.003	0.003	-0.002	0.002	0.001	0.002	-0.000	0.003
66	-0.001	0.002	-0.000	-0.000	-0.001	-0.000	-0.002	-0.000	-0.001	-0.001	-0.000	-0.001	-0.000	0.001	-0.000
67	-0.004	0.003	0.005	0.002	0.001	-0.004	0.003	0.013	-0.004	0.002	-0.020	0.009	0.003	0.003	-0.004
68	0.000	0.005	-0.003	-0.001	-0.002	0.001	-0.004	-0.002	0.000	-0.003	0.004	-0.002	-0.000	0.000	0.001
69	0.000	0.000	0.002	-0.001	0.001	0.001	-0.001	-0.002	0.001	-0.000	0.001	-0.002	-0.000	0.000	0.001
70	0.001	-0.005	0.006	-0.001	0.003	-0.000	0.002	-0.006	0.001	0.002	0.003	-0.005	-0.000	-0.001	-0.001
71	0.000	0.001	-0.001	0.000	-0.001	-0.000	0.000	0.001	-0.000	0.000	0.001	0.001	0.000	-0.001	-0.000
72	-0.001	-0.006	-0.005	0.002	-0.002	-0.000	-0.001	-0.007	-0.001	-0.002	0.012	-0.004	-0.005	-0.002	-0.001
73	0.000	0.002	-0.004	-0.002	-0.002	0.002	-0.006	-0.010	0.001	-0.004	0.016	-0.008	-0.003	-0.002	0.002
74	-0.002	-0.001	-0.000	0.001	-0.001	-0.001	-0.001	-0.000	-0.002	-0.001	0.002	-0.000	-0.002	-0.000	-0.002
75	-0.001	-0.001	-0.016	0.002	-0.006	0.003	-0.006	0.003	-0.000	-0.004	0.012	0.005	-0.006	-0.003	0.003
76	0.000	-0.001	-0.007	0.001	-0.003	0.001	-0.004	-0.006	-0.000	-0.003	0.014	-0.004	-0.004	-0.003	0.001
77	0.001	0.005	0.001	-0.001	-0.001	0.000	-0.002	-0.002	0.000	-0.001	0.004	-0.003	0.001	-0.001	0.000
78	0.001	0.002	0.003	-0.002	0.001	0.001	-0.000	-0.005	0.001	0.000	0.004	-0.005	0.001	-0.000	0.000
79	0.001	0.003	-0.007	-0.002	-0.002	0.003	-0.005	-0.002	0.002	-0.003	0.009	-0.001	-0.002	-0.001	0.003
80	0.000	-0.007	0.001	0.001	0.001	-0.000	0.002	-0.005	0.000	0.001	0.003	-0.003	-0.002	-0.000	0.000
81	-0.001	0.011	0.006	-0.001	0.001	-0.002	0.001	0.009	-0.001	0.000	-0.015	0.005	0.006	0.003	-0.001
82	0.001	0.005	-0.003	-0.001	-0.002	0.001	-0.003	-0.004	0.001	-0.003	0.007	-0.003	0.000	-0.001	0.001
83	-0.002	-0.028	-0.003	0.007	0.003	-0.002	0.009	0.002	-0.002	0.005	-0.010	0.007	-0.006	0.002	-0.001
84	-0.000	-0.005	-0.002	0.002	-0.000	-0.001	0.002	0.001	-0.001	0.001	0.001	0.002	-0.001	-0.001	-0.001

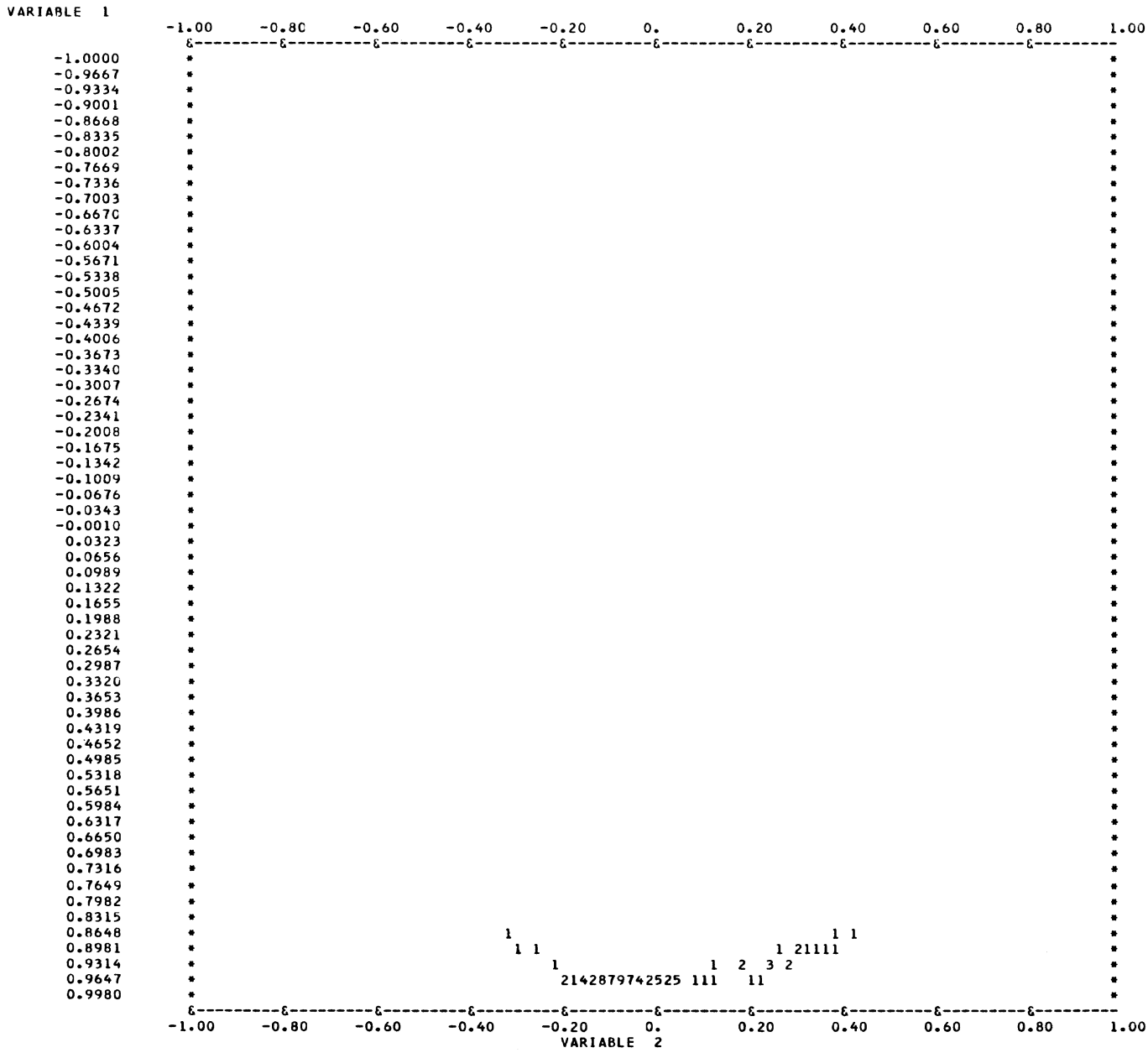
	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
31	0.029														
32	0.011	0.009													
33	0.003	0.002	0.001												
34	0.006	0.007	0.002	0.008											
35	-0.000	0.005	0.002	0.005	0.009										
36	0.004	0.003	0.001	0.003	0.001	0.002									
37	0.002	-0.000	-0.000	-0.000	-0.002	0.000	0.001								
38	-0.002	-0.001	-0.001	-0.000	-0.001	-0.000	0.000	0.000							
39	0.002	0.000	0.000	-0.001	-0.001	-0.000	0.000	0.000	0.001						
40	-0.002	-0.003	-0.001	-0.005	-0.001	0.001	-0.000	0.000	-0.001	0.014					
41	-0.003	-0.001	-0.001	0.000	-0.001	-0.000	0.000	0.000	0.000	-0.002	0.001				
42	-0.001	0.001	-0.000	0.002	0.000	0.000	-0.000	0.000	0.000	-0.002	0.001	0.001			
43	-0.002	-0.000	0.000	-0.000	0.001	-0.001	-0.000	0.000	0.001	-0.004	0.001	0.000	0.002		
44	0.002	0.001	0.000	0.002	-0.000	0.001	0.000	-0.000	-0.001	-0.001	-0.000	0.000	-0.001	0.001	
45	0.001	0.002	0.001	0.001	0.002	-0.000	-0.001	-0.000	0.000	-0.002	-0.000	0.000	0.001	-0.000	0.001
46	0.003	0.001	0.001	0.000	0.002	0.000	-0.000	-0.001	-0.000	0.002	-0.001	-0.001	-0.001	0.000	0.000
47	0.006	0.003	0.000	0.003	-0.001	0.001	0.001	0.001	0.002	-0.004	0.001	0.001	0.001	-0.000	-0.000
48	-0.001	-0.001	-0.000	-0.001	-0.001	-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.000	-0.000
49	0.000	-0.002	-0.002	-0.004	-0.006	-0.000	0.001	0.000	-0.000	0.002	-0.000	-0.000	-0.001	0.000	-0.001
50	-0.005	-0.001	-0.000	0.001	0.000	-0.000	-0.000	0.000	-0.000	-0.002	0.001	0.001	0.001	0.000	-0.000
51	-0.002	0.000	-0.000	0.001	-0.000	-0.000	0.000	0.000	0.000	-0.003	0.001	0.001	0.001	0.000	0.000
52	0.002	0.006	0.002	0.007	0.007	0.003	-0.001	-0.001	-0.001	-0.001	-0.000	0.001	-0.001	0.001	0.001
53	-0.006	-0.003	-0.001	-0.001	-0.002	-0.002	0.000	0.001	0.000	-0.003	0.001	0.001	0.001	-0.001	-0.000
54	-0.001	-0.000	-0.001	-0.001	-0.002	-0.000	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	-0.000	-0.000
55	-0.003	-0.001	-0.001	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	0.000	0.001	0.000	0.000	-0.000	-0.000
56	-0.000	0.000	0.000	-0.000	0.001	-0.001	-0.000	0.000	0.001	-0.004	0.000	0.000	0.002	-0.001	0.001
57	-0.001	-0.002	-0.000	-0.003	-0.001	0.000	-0.000	-0.000	-0.001	0.007	-0.001	-0.001	-0.002	0.000	-0.001
58	-0.001	-0.001	-0.000	0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.001	0.000	0.000	0.000	0.000	-0.000
59	0.008	0.005	0.002	0.003	0.004	0.001	-0.000	-0.001	0.000	-0.002	-0.001	-0.000	0.000	0.000	0.001
60	-0.003	-0.001	-0.000	-0.002	-0.000	-0.001	-0.000	0.001	0.001	-0.003	0.001	0.000	0.002	-0.001	0.001
61	-0.003	-0.002	-0.000	-0.003	-0.001	-0.001	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	0.000	-0.000	0.000
62	-0.000	-0.002	-0.001	-0.001	-0.003	-0.000	0.001	-0.000	-0.000	-0.001	0.000	-0.000	-0.000	0.001	-0.001
63	-0.005	-0.002	-0.001	-0.002	-0.001	-0.000	-0.000	0.000	-0.000	0.001	0.000	0.000	-0.000	-0.000	-0.000
64	-0.000	-0.001	-0.001	0.001	-0.004	-0.001	0.001	0.000	0.001	-0.007	0.001	0.001	0.002	0.000	-0.000
65	-0.005	-0.005	-0.001	-0.006	-0.003	-0.001	0.000	0.000	0.000	0.004	-0.000	-0.001	-0.000	-0.001	-0.001
66	-0.001	-0.001	-0.001	0.000	-0.002	0.000	0.001	0.000	-0.000	-0.000	0.000	0.000	-0.000	0.001	-0.001
67	0.007	0.000	-0.001	-0.001	-0.005	0.001	0.002	0.001	0.002	0.002	0.000	0.000	-0.000	-0.001	-0.001
68	-0.002	-0.003	-0.001	-0.001	-0.003	-0.001	0.001	0.000	-0.001	-0.000	0.000	-0.000	-0.000	0.001	-0.001
69	-0.004	-0.000	-0.000	0.001	0.001	-0.000	-0.000	0.000	-0.000	-0.001	0.001	0.001	0.001	0.000	0.000
70	-0.001	0.004	0.001	0.004	0.006	0.001	-0.001	-0.000	-0.001	-0.003	0.000	0.001	0.001	0.000	0.002
71	0.002	-0.000	0.000	-0.001	-0.001	0.000	0.000	-0.000	0.000	0.002	-0.001	-0.001	-0.001	0.000	-0.000
72	0.000	0.001	0.001	0.003	0.002	0.001	-0.000	-0.001	-0.002	0.001	-0.001	-0.000	-0.001	0.002	-0.000
73	-0.007	-0.002	-0.001	0.001	-0.000	-0.000	-0.000	-0.000	-0.002	0.000	0.000	0.000	-0.001	0.002	-0.001
74	0.001	0.000	-0.000	0.001	-0.001	0.001	0.000	-0.000	-0.001	0.002	-0.000	0.000	-0.001	0.001	-0.001
75	-0.005	-0.007	-0.001	-0.005	-0.003	-0.001	-0.000	-0.000	-0.001	0.010	-0.001	-0.002	-0.003	0.000	-0.002
76	-0.002	-0.002	-0.000	0.000	-0.000	0.000	-0.000	-0.001	-0.002	0.003	-0.001	-0.001	-0.002	0.002	-0.001
77	0.001	-0.000	-0.000	-0.001	-0.002	0.000	0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.001	0.001	-0.000
78	-0.001	0.001	0.000	0.001	0.002	-0.000	-0.000	-0.000	-0.000	-0.003	0.000	0.000	0.001	0.000	0.001
79	-0.006	-0.004	-0.001	-0.003	-0.002	-0.001	-0.000	-0.000	-0.001	0.003	-0.000	-0.001	-0.001	0.000	-0.001
80	-0.001	0.002	0.001	0.003	0.004	0.000	-0.001	-0.000	-0.000	-0.003	0.000	0.001	0.001	0.000	0.001
81	0.006	-0.001	-0.001	-0.003	-0.007	-0.000	0.002	0.001	0.002	-0.001	0.000	0.000	0.000	-0.001	-0.001
82	-0.001	-0.002	-0.001	-0.001	-0.003	-0.001	0.001	-0.000	-0.001	-0.001	-0.000	-0.000	-0.000	0.001	-0.001
83	-0.001	0.004	0.003	0.006	0.010	0.000	-0.002	0.000	0.001	-0.004	0.001	0.001	0.003	-0.002	0.002
84	0.002	0.001	0.001	0.001	0.002	0.001	-0.000	-0.000	0.000	0.001	-0.001	-0.000	-0.000	0.000	0.000

	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
46	0.002														
47	-0.002	0.007													
48	-0.000	0.001	0.000												
49	-0.001	-0.001	-0.000	0.008											
50	-0.001	0.001	0.000	-0.001	0.001										
51	-0.001	0.001	0.000	-0.001	0.001	0.001									
52	0.001	-0.001	-0.001	-0.002	0.001	0.000	0.009								
53	-0.002	0.001	0.001	-0.001	0.002	0.001	-0.003	0.003							
54	-0.001	0.000	0.000	0.003	0.000	0.000	-0.001	0.000	0.001						
55	-0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.001					
56	-0.001	0.001	0.000	-0.001	0.000	0.001	-0.001	0.001	0.000	-0.000	0.002				
57	0.002	-0.004	-0.000	0.003	-0.001	-0.002	-0.000	-0.002	-0.000	-0.000	-0.002	0.004			
58	-0.000	0.000	0.000	-0.000	0.000	0.000	-0.001	0.001	0.000	0.000	0.000	-0.001	0.000		
59	0.001	0.000	-0.001	-0.000	-0.001	-0.001	0.004	-0.003	-0.000	-0.001	0.001	-0.001	-0.001	0.004	
60	-0.001	0.001	0.000	-0.000	0.001	0.001	-0.002	0.002	0.000	0.000	0.002	-0.002	0.000	-0.001	0.002
61	0.000	-0.003	-0.000	0.004	-0.001	-0.001	-0.001	-0.000	0.001	-0.000	0.001	0.002	-0.000	0.000	0.000
62	-0.000	-0.000	0.000	0.002	0.000	0.000	-0.002	0.001	0.000	-0.000	-0.000	0.000	0.000	-0.001	-0.000
63	-0.001	-0.001	0.000	0.002	0.001	0.000	-0.001	0.001	0.001	0.001	-0.000	0.001	0.000	-0.001	0.000
64	-0.002	0.004	0.001	-0.001	0.001	0.002	-0.003	0.003	0.001	0.000	0.002	-0.004	0.001	-0.002	0.002
65	-0.000	-0.003	0.000	0.004	-0.001	-0.001	-0.004	0.000	0.001	0.000	-0.000	0.003	-0.000	-0.002	0.001
66	-0.001	0.001	0.000	0.001	0.000	0.000	-0.001	0.001	0.000	0.000	-0.000	-0.000	0.000	-0.001	-0.000
67	-0.001	0.007	0.001	0.001	-0.001	0.000	-0.004	0.000	0.000	0.000	-0.001	-0.002	-0.000	-0.001	0.001
68	-0.001	-0.001	0.000	0.002	0.000	0.000	-0.002	0.001	0.001	0.000	-0.000	0.001	0.000	-0.002	-0.000
69	-0.001	-0.001	-0.000	0.000	0.001	0.001	0.002	0.001	0.001	0.000	0.000	-0.000	0.000	-0.000	0.000
70	0.001	-0.001	-0.001	-0.001	0.001	0.000	0.006	-0.001	0.000	0.000	0.001	-0.001	-0.000	0.003	-0.000
71	0.001	-0.000	-0.000	0.001	-0.001	-0.001	-0.001	-0.001	-0.000	-0.000	-0.000	0.001	-0.000	0.000	-0.000
72	0.001	-0.003	-0.001	-0.003	0.000	-0.001	0.003	-0.001	-0.002	-0.001	-0.001	0.001	0.000	0.000	-0.002
73	0.000	-0.005	-0.001	0.002	0.001	0.000	0.002	0.000	0.001	0.000	-0.001	0.002	0.000	-0.001	-0.002
74	0.000	0.000	0.000	-0.000	0.000	-0.000	0.001	-0.001	-0.000	0.000	-0.001	0.001	-0.000	-0.001	-0.002
75	0.002	-0.004	0.000	-0.002	-0.001	-0.002	-0.004	0.000	-0.003	-0.000	-0.003	0.005	-0.000	-0.005	-0.002
76	0.001	-0.004	-0.001	-0.000	-0.000	-0.001	0.001	-0.001	-0.001	-0.001	-0.002	0.002	0.000	-0.001	-0.002
77	0.000	-0.001	-0.000	0.003	-0.001	-0.000	-0.000	-0.001	0.001	-0.000	-0.000	0.001	-0.000	0.000	-0.001
78	0.000	-0.002	-0.001	0.002	0.000	0.000	0.002	-0.001	0.001	-0.000	0.001	-0.000	-0.000	0.002	-0.000
79	0.000	-0.004	-0.000	0.001	0.000	-0.001	-0.002	0.001	-0.000	0.000	-0.001	0.003	0.000	-0.002	-0.001
80	0.000	-0.000	-0.000	-0.003	0.001	0.001	0.003	0.000	-0.001	-0.000	0.001	-0.002	0.000	0.001	0.000
81	-0.002	0.005	0.001	0.005	-0.001	0.000	-0.006	0.001	0.002	0.000	0.001	-0.001	-0.000	-0.001	0.001
82	-0.000	-0.002	-0.000	0.003	-0.000	-0.000	-0.002	0.000	0.001	-0.000	-0.000	0.001	0.000	-0.001	-0.001
83	0.000	0.005	0.001	-0.015	0.002	0.002	0.004	0.002	-0.004	0.000	0.002	-0.007	0.001	0.000	0.003
84	0.001	0.000	-0.000	-0.003	-0.000	-0.000	0.001	-0.001	-0.001	-0.000	-0.000	0.000	-0.000	0.001	-0.001

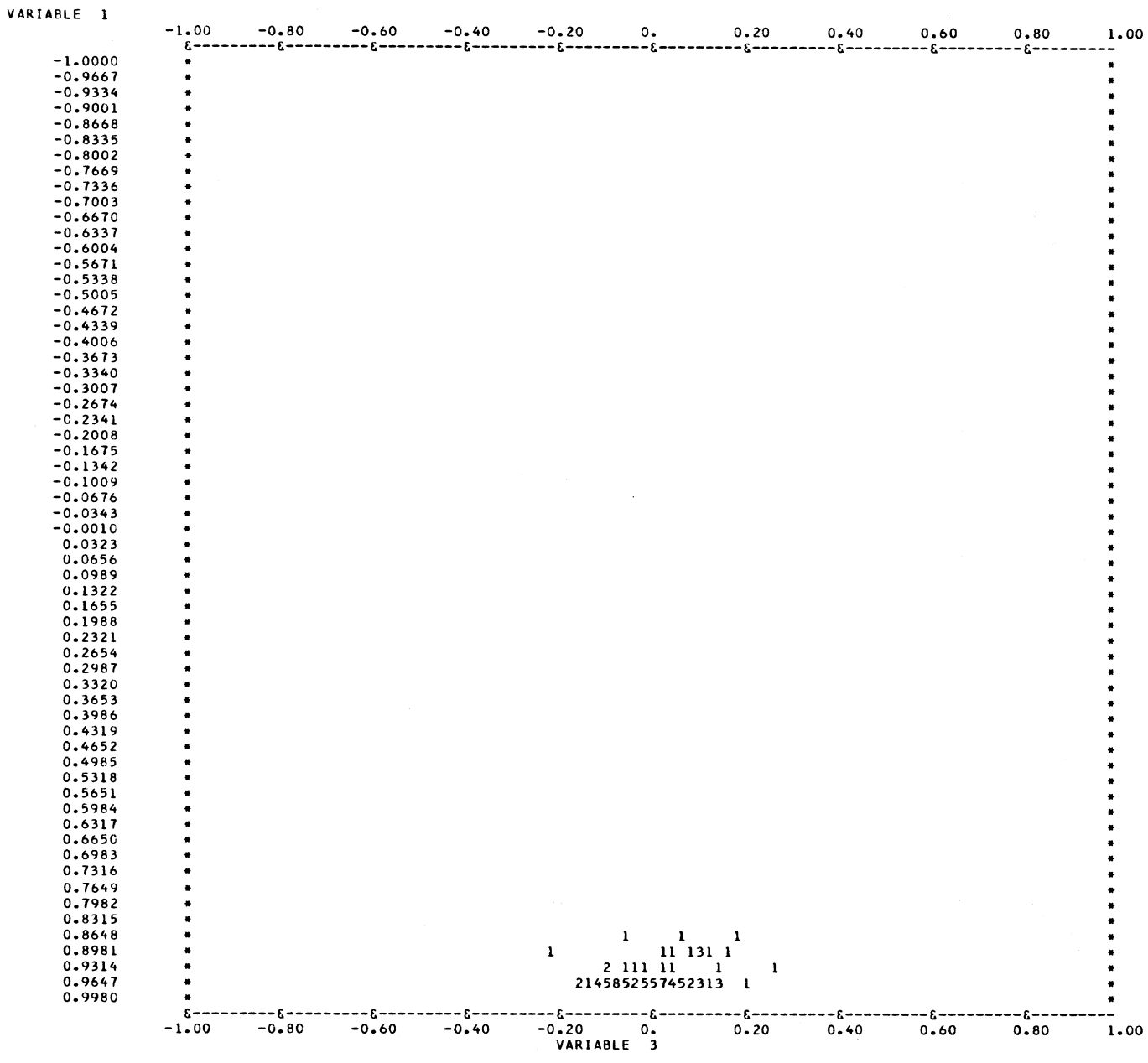
	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
61	0.004														
62	0.000	0.002													
63	0.001	0.000	0.001												
64	-0.002	0.002	-0.000	0.006											
65	0.003	0.001	0.002	-0.001	0.005										
66	-0.000	0.001	0.000	0.001	0.000	0.001									
67	-0.003	0.000	-0.001	0.002	-0.000	0.001	0.010								
68	0.001	0.002	0.001	0.001	0.001	0.001	-0.001	0.002							
69	0.001	-0.000	0.001	-0.000	0.000	-0.000	-0.002	0.000	0.001						
70	0.001	-0.002	-0.000	-0.002	-0.002	-0.001	-0.005	-0.001	0.002	0.006					
71	0.000	0.000	-0.000	-0.001	0.001	-0.000	0.001	0.000	-0.001	-0.001	0.001				
72	-0.001	0.001	-0.001	-0.001	-0.002	0.000	-0.004	0.000	-0.000	0.001	0.000	0.005			
73	0.002	0.002	0.002	-0.001	0.001	0.001	-0.006	0.002	0.002	0.002	-0.000	0.003	0.007		
74	-0.001	0.001	0.000	-0.000	-0.001	0.001	0.001	0.001	-0.000	-0.001	0.000	0.002	0.001	0.002	
75	-0.002	0.001	0.001	-0.002	0.002	0.001	-0.000	0.001	-0.002	-0.005	0.001	0.004	0.002	0.002	0.014
76	0.000	0.001	0.000	-0.001	0.000	0.001	-0.004	0.002	-0.000	-0.000	0.000	0.004	0.004	0.002	0.005
77	0.002	0.001	0.000	-0.001	0.001	0.000	-0.001	0.001	0.000	-0.000	0.000	0.000	0.002	0.000	-0.001
78	0.002	-0.000	0.000	-0.001	0.000	-0.000	-0.003	0.000	0.001	0.003	-0.000	-0.000	0.002	-0.001	-0.004
79	0.001	0.001	0.001	-0.001	0.002	0.000	-0.003	0.002	0.000	-0.001	0.000	0.001	0.003	0.000	0.005
80	-0.001	-0.001	-0.001	0.000	-0.002	-0.001	-0.003	-0.001	0.001	0.003	-0.001	0.001	0.001	-0.000	-0.002
81	0.001	0.001	0.000	0.003	0.002	0.001	0.007	0.001	-0.001	-0.004	0.001	-0.005	-0.004	-0.000	-0.003
82	0.002	0.002	0.001	0.001	0.001	0.001	-0.002	0.002	-0.000	-0.001	0.000	0.001	0.003	0.000	0.001
83	-0.008	-0.004	-0.003	0.002	-0.008	-0.002	0.002	-0.005	-0.000	0.002	-0.001	0.002	-0.006	-0.000	0.001
84	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000	0.000	-0.001	-0.001	-0.000	0.000	0.001	-0.001	0.000	0.002

	76	77	78	79	80	81	82	83	84
76	0.005								
77	0.001	0.001							
78	0.000	0.001	0.002						
79	0.003	0.001	-0.000	0.003					
80	0.000	-0.001	0.001	-0.001	0.003				
81	-0.004	0.001	-0.001	-0.002	-0.004	0.009			
82	0.002	0.002	0.001	0.002	-0.001	0.001	0.003		
83	-0.003	-0.007	-0.004	-0.004	0.006	-0.007	-0.006	0.030	
84	0.000	-0.001	-0.001	-0.000	0.001	-0.002	-0.001	0.004	0.001

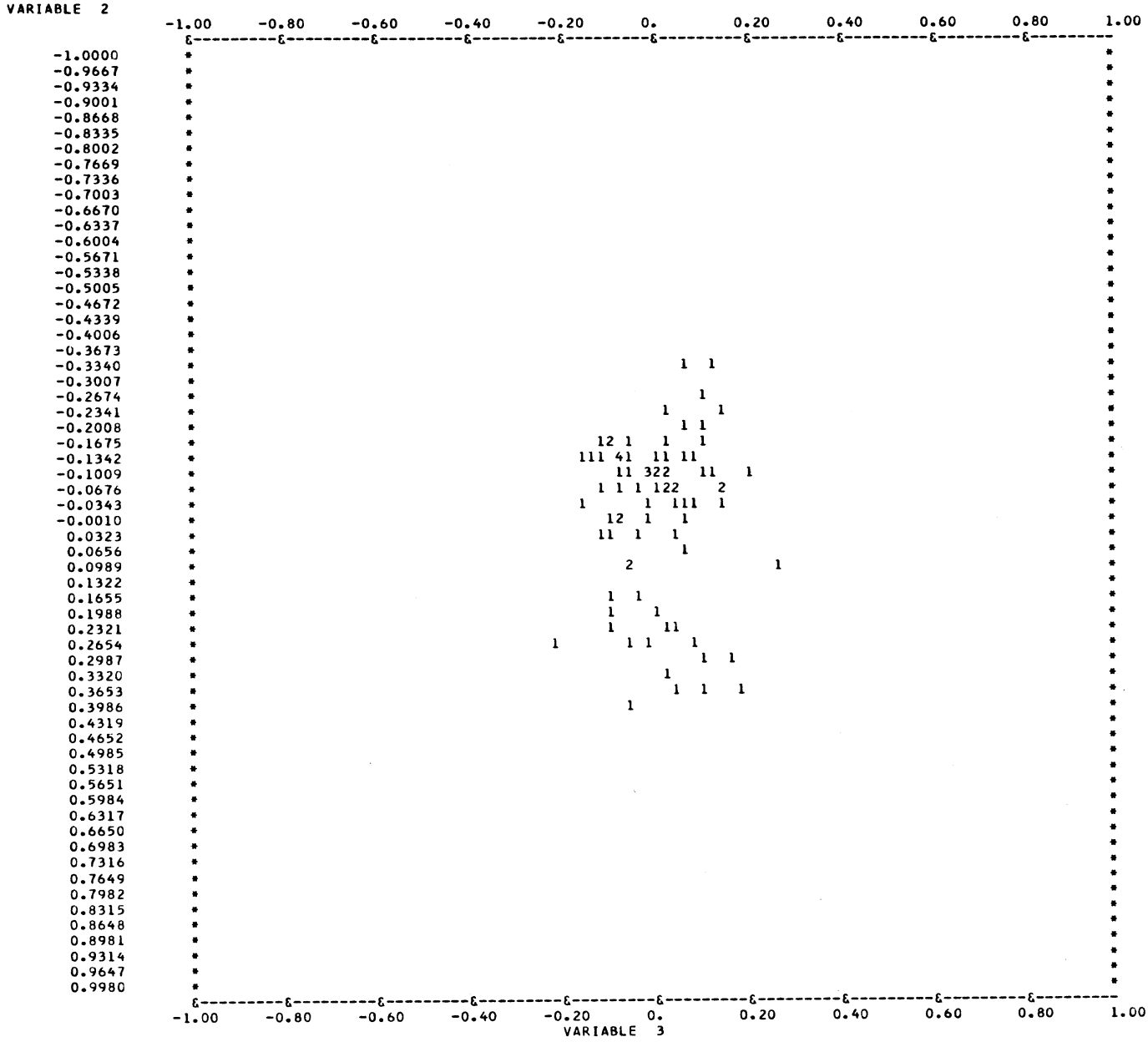
SCATTERGRAM OF FACTOR LOADING
FACTOR 1 VS. 2



SCATTERGRAM OF FACTOR LOADING
FACTOR 1 VS. 3



SCATTERGRAM OF FACTOR LOADING
FACTOR 2 VS. 3



VARIMAX ROTATION

THOLEIITIC - ALKALIC BASALT PROBLEM Q-MODE FACTOR ANALYSIS

PROBLEM NAME QMODFNVT 84 VARIABLES , 3 FACTORS

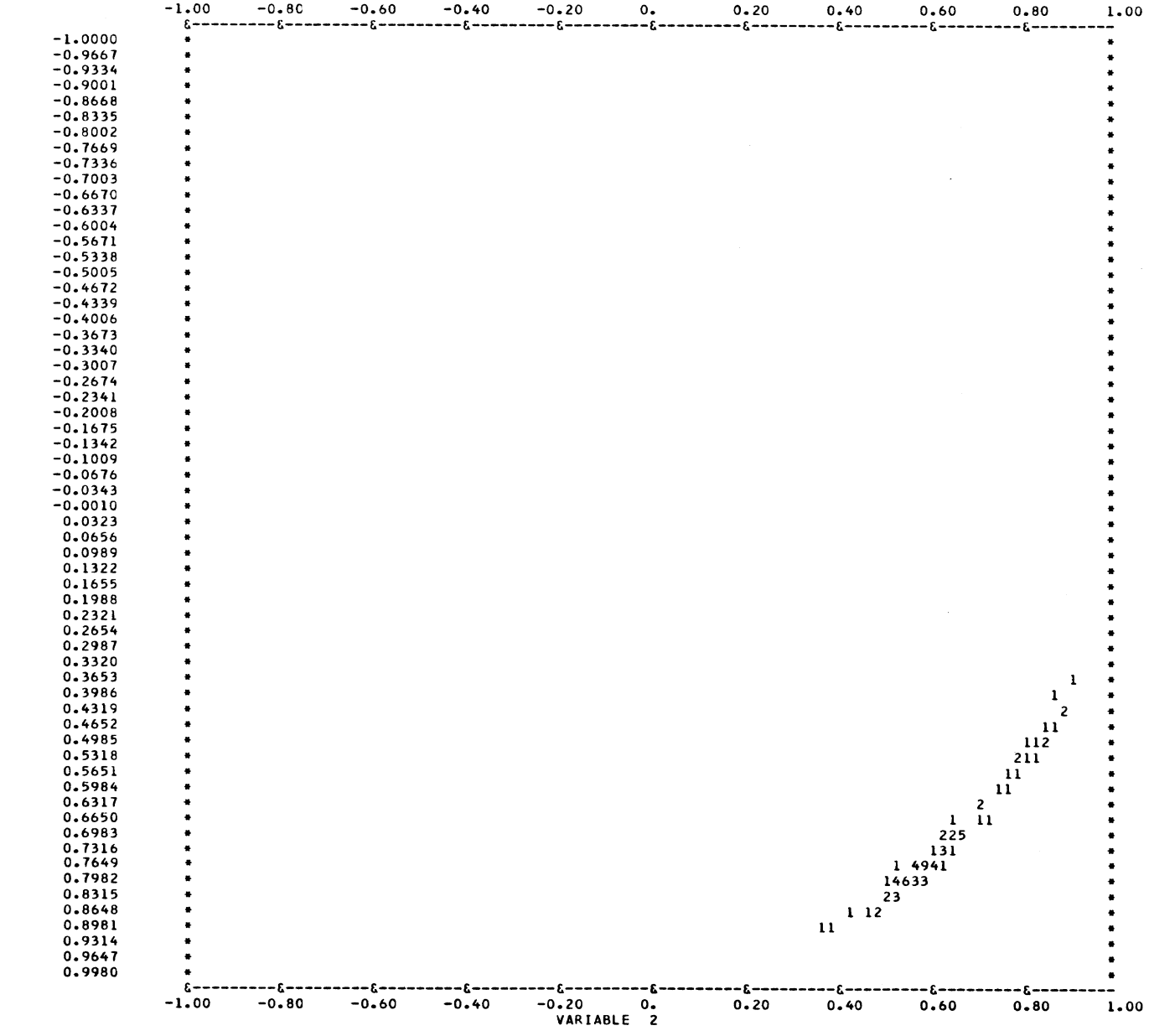
THE ORIGINAL MATRIX OF FACTOR LOADINGS

	F 1	F 2	F 3	F 4	F 5	F 6	F 7	F 8	F 9	F 10	COMMUNALITIES
1	0.87756	0.42176	-0.06333	-0.15647	0.10868						0.98830
2	0.89289	0.38767	0.17120	0.08268	-0.12329						0.99889
3	0.91070	0.38798	0.09463	-0.03805	0.00803						0.99036
4	0.92054	0.36881	0.03542	-0.06148	0.05877						0.99190
5	0.92855	0.34968	0.02063	-0.05280	0.06784						0.99229
6	0.92499	0.32477	0.16733	0.05599	-0.02828						0.99301
7	0.93124	0.30336	0.09626	-0.03825	-0.07200						0.97515
8	0.91428	0.29612	0.08620	-0.15123	0.15152						0.97686
9	0.95043	0.28326	-0.02242	-0.01679	-0.10769						0.99593
10	0.94916	0.27289	-0.06236	-0.05678	0.05290						0.98528
11	0.92056	0.26552	-0.22702	-0.14544	0.07503						0.99626
12	0.93973	0.24616	0.01003	-0.03108	0.10930						0.95670
13	0.94888	0.23655	0.03215	0.09049	-0.11533						0.97885
14	0.95622	0.23909	-0.10465	-0.00080	-0.09803						0.99208
15	0.97043	0.21204	0.00673	-0.03377	-0.08571						0.99524
16	0.96721	0.20298	-0.10960	0.01570	-0.07713						0.99491
17	0.95019	0.18776	-0.04945	-0.13886	0.08951						0.96786
18	0.96320	0.17467	-0.09364	-0.05386	-0.02908						0.97078
19	0.94767	0.11282	0.26016	0.05178	-0.12032						0.99565
20	0.98855	0.10692	-0.05708	-0.06410	-0.02978						0.99692
21	0.97738	0.11610	-0.06411	-0.02098	-0.14725						0.99499
22	0.98736	0.08405	0.05903	0.06893	-0.00294						0.99019
23	0.98418	0.04185	-0.04704	0.02946	0.05017						0.97596
24	0.97839	0.03992	-0.12653	0.06025	-0.13010						0.99540
25	0.98821	0.04345	0.03137	0.12252	0.02905						0.99528
26	0.96545	0.02923	0.05296	0.07685	0.02184						0.94214
27	0.99134	0.02906	-0.01628	0.01077	-0.04292						0.98583
28	0.99019	0.04674	-0.09775	0.03722	0.02129						0.99405
29	0.98215	-0.00338	0.13662	0.08310	0.08466						0.99736
30	0.98432	0.00936	-0.07246	0.08026	-0.11076						0.99294
31	0.96795	0.03012	-0.07322	-0.16070	0.04048						0.97066
32	0.98990	0.00991	-0.09241	0.04277	-0.03163						0.99137
33	0.99782	-0.00142	-0.02533	0.02740	-0.04347						0.99892
34	0.97883	-0.00581	-0.16951	0.02520	-0.06361						0.99157
35	0.98994	-0.01161	0.04941	0.02167	-0.08665						0.99054
36	0.99398	-0.01629	0.05126	0.08573	0.00631						0.99827
37	0.97931	-0.03563	0.14650	0.12217	0.05180						0.99940
38	0.99019	-0.03332	0.07977	0.06088	0.08862						0.99951
39	0.97792	-0.04984	0.14435	0.12687	0.05791						0.99910
40	0.98708	-0.04190	-0.07156	-0.02852	0.06091						0.98572
41	0.99197	-0.05656	0.04059	0.06345	0.07898						0.99911
42	0.99066	-0.06370	0.01527	0.09125	0.07125						0.99911
43	0.99304	-0.07346	0.00713	0.06467	0.05073						0.99833
44	0.98950	-0.05812	-0.11786	0.03551	-0.03115						0.99861
45	0.98641	-0.15869	0.01833	-0.01804	-0.00862						0.99891
46	0.99564	-0.05242	0.00234	-0.00151	-0.06594						0.99840
47	0.99034	-0.06163	0.04758	-0.07995	-0.01262						0.99339
48	0.99297	-0.07050	-0.01894	0.07782	0.04830						0.99971
49	0.97070	-0.08539	0.19723	-0.01214	-0.05545						0.99166
50	0.99297	-0.07427	0.02673	0.03198	0.07278						0.99854
51	0.99254	-0.06696	0.02764	0.06716	0.06335						0.99890
52	0.98977	-0.06479	-0.04332	0.07169	-0.01765						0.99116
53	0.98820	-0.08566	0.02258	0.02367	0.10875						0.99678
54	0.99475	-0.07102	-0.02784	0.04604	0.03437						0.99866
55	0.99121	-0.09129	-0.02435	0.05870	0.06733						0.99941
56	0.98752	-0.09533	0.10850	0.02848	0.03565						0.99814
57	0.98684	-0.08565	-0.05153	-0.10797	-0.00600						0.99553
58	0.99423	-0.10452	0.00724	-0.00830	-0.01194						0.99968
59	0.98775	-0.08875	0.00330	0.11036	0.00494						0.99575
60	0.98759	-0.10692	0.08701	0.02089	0.05263						0.99754
61	0.98549	-0.10595	0.01063	0.08589	0.07819						0.99602
62	0.99060	-0.09430	-0.07844	0.04255	0.00764						0.99821
63	0.98763	-0.11216	-0.08648	0.04173	0.03986						0.99880
64	0.97198	-0.10870	-0.15216	0.07790	-0.09022						0.99392
65	0.98797	-0.12496	0.05964	-0.00324	0.00314						0.99527
66	0.99028	-0.11327	-0.07173	0.02213	0.00517						0.99914
67	0.97922	-0.11830	-0.12367	0.03784	-0.02303						0.99013
68	0.98723	-0.12597	-0.08302	0.00485	0.02267						0.99792
69	0.98822	-0.12479	-0.06572	0.02971	0.03884						0.99887
70	0.98493	-0.12884	-0.08454	0.02280	-0.00693						0.99441
71	0.98225	-0.14852	0.10684	-0.03418	-0.00327						0.99948
72	0.97954	-0.12758	-0.13738	0.02586	-0.00855						0.99540
73	0.97932	-0.13848	-0.11997	0.00473	0.01079						0.99278
74	0.98553	-0.15536	-0.05308	-0.00903	-0.01139						0.99844
75	0.97391	-0.15865	-0.10115	0.02680	0.03238						0.98566
76	0.97566	-0.16449	-0.10893	-0.05663	0.03704						0.99541
77	0.97581	-0.18149	0.06340	-0.07990	-0.05444						0.99850
78	0.97040	-0.20008	0.09120	-0.06653	-0.05548						0.99753
79	0.96858	-0.20923	0.02362	-0.11010	-0.04902						0.99701
80	0.94796	-0.22954	0.14531	-0.15213	-0.04206						0.99734
81	0.92873	-0.26095	0.09049	-0.22433	-0.04369						0.99104
82	0.92044	-0.30303	0.12951	-0.19763	-0.05137						0.99750
83	0.89386	-0.31306	0.06388	-0.25505	-0.05828						0.96952
84	0.98778	-0.07608	0.11878	-0.03348	0.04419						0.99868
SUM SQ	79.23934	2.47862	0.72735	0.54935	0.35204						
VAREXP	94.33255	2.95074	0.86589	0.65399	0.41909						
CUMPER	94.33255	97.28329	98.14919	98.80318	99.22227						

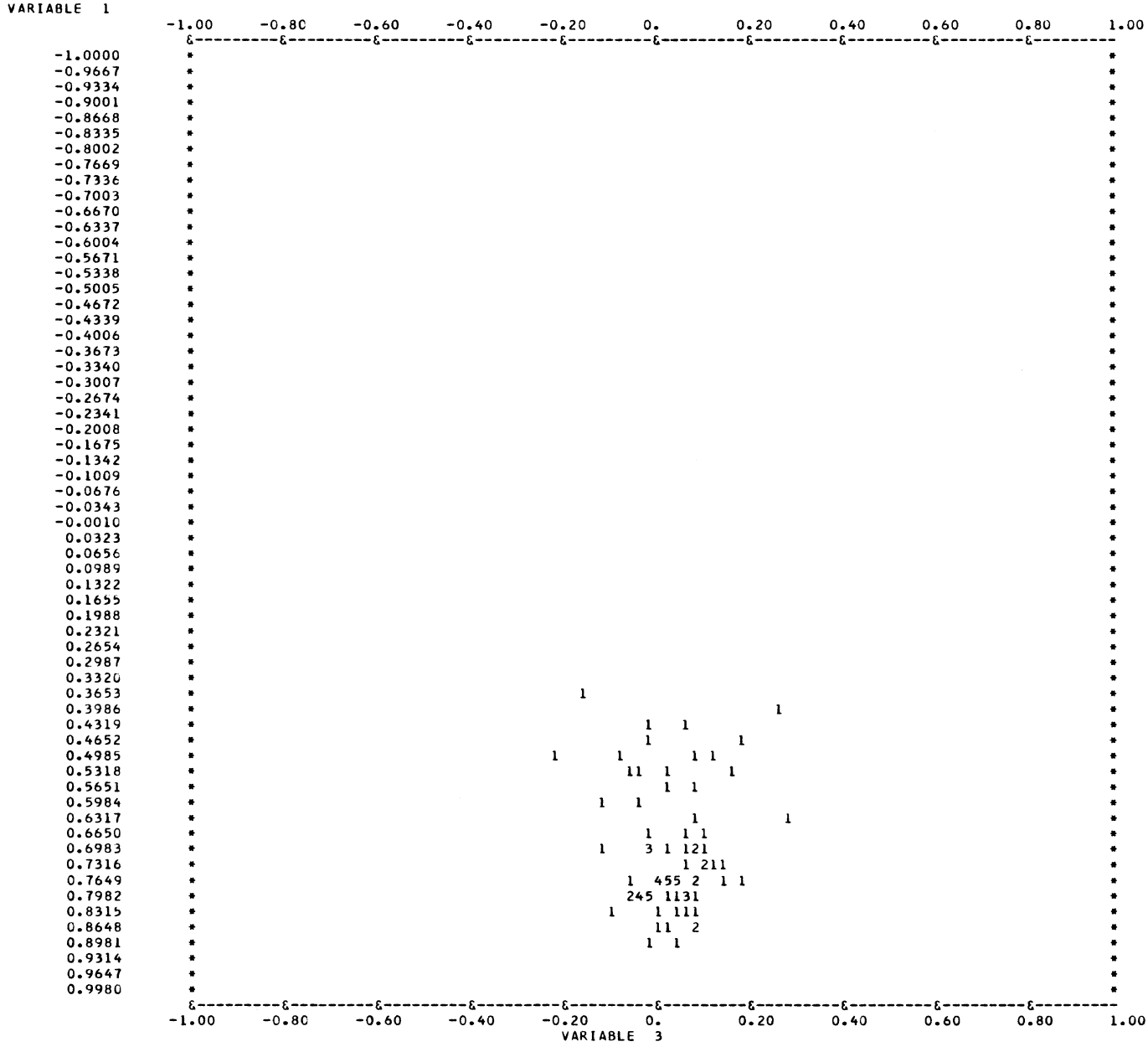
THE ROTATED MATRIX OF FACTOR LOADINGS

	F 1	F 2	F 3	F 4	F 5	F 6	F 7	F 8	F 9	F 10	COMMUNALITIES
1	0.39572	0.89730	-0.15018								0.98429
2	0.41882	0.86475	0.25231								0.98687
3	0.44062	0.88731	0.06616								0.98584
4	0.45959	0.87944	-0.01346								0.98481
5	0.47641	0.86864	-0.02439								0.98209
6	0.48821	0.84230	0.17678								0.97907
7	0.50938	0.83444	0.11803								0.96969
8	0.51622	0.83400	-0.08412								0.96911
9	0.52560	0.82220	0.07830								0.95839
10	0.53596	0.81918	-0.06788								0.96291
11	0.51622	0.79568	-0.22462								0.95004
12	0.55041	0.79556	-0.04856								0.93822
13	0.54873	0.77798	0.16520								0.93366
14	0.55160	0.78668	0.02860								0.92394
15	0.59111	0.78473	0.07396								0.97068
16	0.58197	0.76495	0.01956								0.92422
17	0.60145	0.76485	-0.12212								0.96164
18	0.60602	0.74972	-0.03387								0.93048
19	0.64807	0.69914	0.28895								0.99228
20	0.67267	0.71749	-0.01580								0.96752
21	0.65113	0.70986	0.07492								0.93349
22	0.68339	0.69319	0.09878								0.95729
23	0.70576	0.65862	-0.01910								0.93224
24	0.68999	0.64183	0.06192								0.89186
25	0.70431	0.65698	0.08532								0.93495
26	0.70207	0.63704	0.08146								0.90535
27	0.72120	0.65472	0.05107								0.95139
28	0.70209	0.66201	-0.02786								0.93196
29	0.74267	0.62837	0.09533								0.95549
30	0.71681	0.62383	0.09160								0.91138
31	0.71655	0.65630	-0.11665								0.95778
32	0.72449	0.63234	0.01150								0.92488
33	0.74371	0.63362	0.05330								0.95742
34	0.72179	0.61016	-0.02379								0.89384
35	0.74929	0.62434	0.12391								0.96659
36	0.75180	0.61945	0.09471								0.95788
37	0.75790	0.59799	0.13993								0.95158
38	0.76627	0.61004	0.04760								0.96158
39	0.76567	0.58588	0.13662								0.94817
40	0.76627	0.60155	-0.06856								0.95373
41	0.77948	0.59097	0.03070								0.95777
42	0.77861	0.58046	0.03275								0.94424
43	0.78813	0.57624	0.02871								0.95402
44	0.76734	0.57983	-0.00860								0.92509
45	0.84563	0.51458	0.03458								0.98108
46	0.77938	0.59728	0.07077								0.96919
47	0.79306	0.59828	0.02805								0.98766
48	0.78303	0.57572	0.02035								0.94500
49	0.79725	0.56796	0.17757								0.98972
50	0.79351	0.58036	0.01158								0.96661
51	0.78505	0.58201	0.03439								0.95621
52	0.77419	0.57570	0.04494								0.93283
53	0.79865	0.57013	-0.01818								0.96322
54	0.78666	0.57876	0.00932								0.95388
55	0.79706	0.56085	-0.00427								0.94987
56	0.80842	0.56469	0.08357								0.97940
57	0.80172	0.57542	-0.05023								0.97639
58	0.81447	0.55907	0.03527								0.97717
59	0.78860	0.55547	0.07639								0.93627
60	0.81557	0.55595	0.05586								0.97736
61	0.80257	0.54552	0.02232								0.94221
62	0.79479	0.55543	-0.00654								0.94024
63	0.80444	0.54040	-0.03286								0.94024
64	0.77943	0.52281	0.02662								0.88154
65	0.82670	0.54221	0.05961								0.98099
66	0.80919	0.54312	-0.01044								0.94988
67	0.79838	0.52723	-0.01735								0.91567
68	0.81636	0.53305	-0.03677								0.95193
69	0.81566	0.53346	-0.02512								0.95051
70	0.81406	0.52684	-0.01056								0.94037
71	0.84381	0.52606	0.07804								0.99485
72	0.80512	0.52118	-0.04066								0.92150
73	0.81567	0.51624	-0.05223								0.93455
74	0.83683	0.51179	-0.00329								0.96222
75	0.82457	0.49682	-0.04486								0.92875
76	0.83687	0.50138	-0.09087								0.96000
77	0.86034	0.49783	0.06275								0.99195
78	0.86912	0.48040	0.08621								0.99359
79	0.87304	0.47311	0.02048								0.98645
80	0.88348	0.45525	0.07055								0.99277
81	0.89218	0.42319	0.00395								0.97508
82	0.91352	0.38522	0.04430								0.98487
83	0.90054	0.36253	-0.01870								0.94275
84	0.80268	0.58630	0.05624								0.99120
SUM SQ	45.60176	34.01126	0.59869								
VAREXP	54.28781	40.48959	0.71273								
CUMPER	54.28781	94.77740	95.49013								

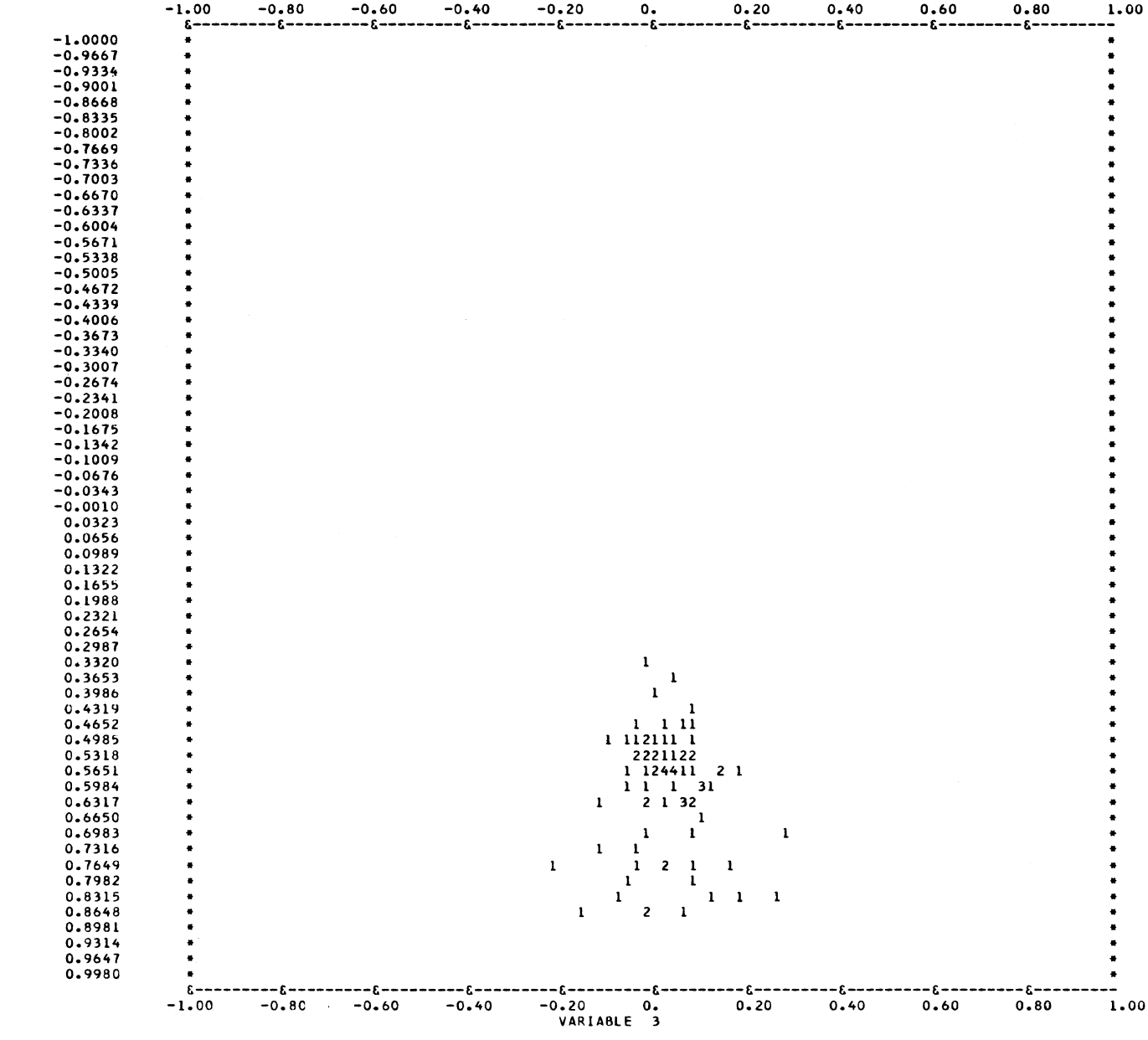
SCATTERGRAM OF ROTATED FACTORS
FACTOR 1 VS. 2



SCATTERGRAM OF ROTATED FACTORS
FACTOR 1 VS. 3



SCATTERGRAM OF ROTATED FACTORS
FACTOR 2 VS. 3



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KANSAS GEOLOGICAL SURVEY COMPUTER PROGRAM
THE UNIVERSITY OF KANSAS, LAWRENCE

PROGRAM ABSTRACT

Title (If subroutine state in title):

CORFAN - FORTRAN IV Computer Program for Correlation, Factor Analysis (R- and Q-Mode) and Varimax Rotation

Date: May, 1969

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Purpose/description: Computation of correlation coefficients ($\leq$ 100 Variables) and production of factor analysis in the R- and Q-modes together with optional VARIMAX rotation on K original factors. Options are provided to produce desired scatter diagrams of original data (X vs. Y) and plots of loadings of one factor against the other for unrotated and rotated factor matrix.

Mathematical method: Pearson product moment correlation coefficients, R-mode factor analysis, Cos θ, Q-mode factor analysis (Imbrie and Purdy, 1962) and Kaiser varimax rotation (Kaiser, 1958)

Restrictions, range: Accepts, with the present program dimension, 100 variables and an unlimited sample size. Produces up to 100 and rotates $\leq$ 60 factors.

Computer manufacturer: GE or IBM Model: 635 or System/360 Model 50

Programming language: FORTRAN IV

Memory required: _____ K Approximate running time: _____

Special peripheral equipment required: None

Remarks (special compilers or operating systems, required word lengths, number of successful runs, other machine versions, additional information useful for operation or modification of program)

Approximately 45K is required on the GE 635; 205K on the IBM System/360. About 3 minutes is necessary running time for a given problem on the GE 635.

(continued from inside front cover)

10. Three-dimensional response surface program in FORTRAN II for the IBM 1620 computer, by R.J. Sampson and J.C. Davis, 1967 . . . . . $0.75
11. FORTRAN IV program for vector trend analyses of directional data, by W.T. Fox, 1967 . $1.00
12. Computer applications in the earth sciences: Colloquium on trend analysis, edited by D.F. Merriam and N.C. Cocke, 1967 . . . . . $1.00
13. FORTRAN IV computer programs for Markov chain experiments in geology, by W.C. Krumbein, 1967 . . . . . $1.00
14. FORTRAN IV programs to determine surface roughness in topography for the CDC 3400 computer, by R.D. Hobson, 1967 . . . . . $1.00
15. FORTRAN II program for progressive linear fit of surfaces on a quadratic base using an IBM 1620 computer, by A.J. Cole, C. Jordan, and D.F. Merriam, 1967 . . . $1.00
16. FORTRAN IV program for the GE 625 to compute the power spectrum of geological surfaces, by J.E. Esler and F.W. Preston, 1967 . . . . . $0.75
17. FORTRAN IV program for Q-mode cluster analysis of nonquantitative data using IBM 7090/7094 computers, by G.F. Bonham-Carter, 1967 . . . . . $1.00
18. Computer applications in the earth sciences: Colloquium on time-series analysis, edited by D.F. Merriam, 1967 . . . . . $1.00
19. FORTRAN II time-trend package for the IBM 1620 computer, by J.C. Davis and R.J. Sampson, 1967 . . . . . $1.00
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26. FORTRAN IV computer program for simulation of transgression and regression with continuous-time Markov models, by W.C. Krumbein, 1968 . . . . . $1.00
27. Stepwise regression and nonpolynomial models in trend analysis, by A.T. Miesch and J.J. Connor, 1968 . . . . . $1.00
28. KWIKR8 a FORTRAN IV program for multiple regression and geologic trend analysis, by J.E. Esler, P.F. Smith, and J.C. Davis, 1968 . . . . . $1.00
29. FORTRAN IV program for harmonic trend analysis using double Fourier series and regularly gridded data for the GE 625 computer, by J.W. Harbaugh and M.J. Sackin, 1968 . $1.00
30. Sampling a geological population, by J.C. Griffiths and C.W. Ondrick, 1968 . . $1.00
31. Multivariate procedures and FORTRAN IV program for evaluation and improvement of classifications, by Ferruh Demirmen, 1969 . . . . . $1.00
32. FORTRAN IV programs for canonical correlation and canonical trend-surface analysis, by P.J. Lee, 1969 . . . . . $1.00
33. FORTRAN IV program for construction of Pi diagrams with the Univac 1108 computer, by Jeffrey Warner, 1969 . . . . . $1.00
34. FORTRAN IV program for nonlinear estimation, by R.B. McCammon, 1969 . . . $0.75
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42. CORFAN-FORTRAN IV computer program for correlation, factor analysis (R- and Q-mode) and varimax rotation, by C.W. Ondrick and G.S. Srivastava, 1970 . . . $1.50