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Page 4 has been revised.

COMMON USERS GROUP PROGRAM REVIEW AND EVALUATION

(fill out in typewriter, ink or pencil)

Program No._____ Date_____

Program Name:_____

1. Does the abstract adequately describe what the program is and what it does? Yes____ No____
   Comment_____

2. Does the program do what the abstract says? Yes____ No____
   Comment_____

3. Is the description clear, understandable, and adequate? Yes____ No____
   Comment_____

4. Are the Operating Instructions understandable and in sufficient detail? Yes____ No____
   Comment_____
   Are the Sense Switch options adequately described (if applicable)? Yes____ No____
   Are the mnemonic labels identified or sufficiently understandable? Yes____ No____
   Comment_____

5. Does the source program compile satisfactorily (if applicable)? Yes____ No____
   Comment_____

6. Does the object program run satisfactorily? Yes____ No____
   Comment_____

7. Number of test cases run_____. Are any restrictions as to data, size, range, etc. covered adequately in description? Yes____ No____
   Comment_____

8. Does the Program meet the minimal standards of COMMON? Yes____ No____
   Comment_____

9. Were all necessary parts of the program received? Yes____ No____
   Comment_____

10. Please list on the back any suggestions to improve the usefulness of the program. These will be passed onto the author for his consideration.

Please return to:

Mr. Richard L. Pratt
Data Corporation
7500 Old Xenia Pike
Dayton, Ohio 45432

Your Name _____
Company _____
_____
Address _____
_____
Users Group Code _____

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11/1/65

DOES
(Disk Oriented Equation Solver)

Author: Mr. Robert Stephenson
University Computing Center
University of Cincinnati

Date: 1/29/65

Membership Code: 3015

"Modifications or revisions to this program, as they occur, will be announced in the appropriate Catalog of Programs for IBM Data Processing Systems. When such an announcement occurs, users should order a complete new program from the Program Information Department."

1620 USERS GROUP LIBRARY
PROGRAM ABSTRACT

1. TITLE (If subroutine, state in Title): "DOES" (Disk Oriented Equation Solver)
Subject Classification: 5.0
2. Author; Organization: Mr. Robert Stephenson
University Computing Center of the University of Cincinnati
Date: 1/28/65 Users Group Membership Code: 3015
3. Direct Inquiries to Name: Dr. Carl F. Evert, Director
University of Cincinnati Phone: 475-2333
4. Description/Purpose: (5. Method; 6. Restriction/Range; When Applicable):
This program utilizes the 1311 Disk to extend the capacity of the 1620 for the solution of simultaneous algebraic equations or matrix inversion. 200 x 200 matrices may be inverted.

7. Specifications (Check or fill in appropriate spaces):

a. Storage used by program: 40K and 1311 Disk

b. Equipment required by program: Card X ; Magnetic Tape ; Number of Drives ; Paper Tape ; Disk File X ; Number of Drives 1 ; TNS, TNF, MF X ; Auto divide X ; Indirect addressing X ; Floating Point Hardware X ; 1620 Model I X ; Model II ; 1443 Printer ; Index Registers ; Binary Capabilities ; Other (specify)

Can program be used on lesser machine? Yes . Specify which requirements can be easily removed See "Additional Remarks."

c. Programmed in: Fortran without Format ; Fortran with Format ; Fortran II ; Other Fortran (specify) ; SPS (specify assembler used) SPS-IID ; Other (specify)

d. Type of Program: Mainline, complete X ; Subroutine ; If subroutine, for use with SPS (specify type of SPS) ; Fortran (specify type of Fortran ; Other (specify)

8. Additional Remarks: Program could be used on a 20K machine with no difficulty and with reassemble, it could be used on machines without the automatic floating point feature.

Table of Contents

Deck Labelling Sheet

Deck	Name
1	Source Deck (01010-13200)
2	Object Deck (1-68)
3	Sample Problem Input
4	Sample Problem Output

PROGRAM WRITE-UP

a) DOES (Disk Oriented Equation Solver)
b) Date: 1/29/65
c) Dr. Carl F. Evert, Director; University of Cincinnati; 475-2333; Membership Code - 3015
d) Program Description

The technique used for this inversion is based on a process described by Sherman.[1]

Sherman states: Given a matrix [A] differing from another matrix [a] only in the elements of one column, the inverse of [A], [B], can be found knowing the inverse of [a], [b], and the elements of the kth column of [A]. Where the kth column is the column of difference between [A] and [a]. The expressions for calculating the elements of [B] are:

$$B_{kj} = b_{kj}/Z_k \qquad j = 1,2,3.....,N.$$

$$Z_n = \sum_{r=1}^{N} b_{nr}A_{rk} \qquad n = 1,2,3.....,N.$$

$$B_{ij} = b_{ij} - Z_iB_{kj} \qquad i = 1,2..k-1,k+1,...N. \quad j = 1,2,3,.....N.$$

N = The size of the matrices.

B_{ab}= The element of [B] located in the ath row and the bth column.

b_{ab}= The element of [b] located in the ath row and the bth column.

A_{rk}= All the elements in the kth column of [A], since r=1,2,3,...N.

Z_n = The matrix product of the nth row of [b] and the kth column of [A].

Consider the following example:

$$[a] = \begin{bmatrix}1&0&0\\0&1&0\\0&0&1\end{bmatrix} \qquad [b] = \begin{bmatrix}1&0&0\\0&1&0\\0&0&1\end{bmatrix} \qquad [A] = \begin{bmatrix}7&0&0\\5&1&0\\8&0&1\end{bmatrix}$$

k = 1 and N = 3.

---

[1] Sherman, Jack; "Adjustment of an Inverse Matrix Corresponding to a Change in the Elements of a Given Column," U.S. Department of Commerce, National Bureau of Standards, Applied Mathematics Series # 29.

$$Z_1 = [1\ 0\ 0].\begin{bmatrix}7\\8\\5\end{bmatrix} = 7. \qquad Z_2 = [0\ 1\ 0].\begin{bmatrix}7\\5\\8\end{bmatrix} = 5.$$

$$Z_3 = [0\ 0\ 1].\begin{bmatrix}7\\5\\8\end{bmatrix} = 8.$$

$B_{11} = b_{11}/Z_1 = 1/7.$ $B_{12} = b_{12}/Z_1 = 0/7 = 0.$ $B_{13} = b_{13}/Z_1 = 0/7 = 0.$

$B_{21} = b_{21} - Z_2B_{11} = 0 - 5(1/7) = -5/7.$

$B_{22} = b_{22} - Z_2B_{12} = 1 - 5(0) = 1.$

$B_{23} = b_{23} - Z_2B_{13} = 0 - 5(0) = 0.$

$B_{31} = b_{31} - Z_3B_{11} = 0 - 8(1/7) = -8/7.$

$B_{32} = b_{32} - Z_3B_{12} = 0 - 8(0) = 0.$

$B_{33} = b_{33} - Z_3B_{13} = 1 - 8(0) = 1.$

$$[A]^{-1} = [B] = \begin{bmatrix}1/7&0&0\\-5/7&1&0\\-8/7&0&1\end{bmatrix}$$

The general inversion program starts by generating a N x N identity matrix and storing it on the disk. The matrix on the disk is the [b] matrix. The first column of data is read into the memory. An inversion process is then performed letting [A] be a matrix different from an identity matrix only in the first column, and that column is the one just read. As the inversion is performed, the [B] matrix is stored on the disk replacing the identity matrix. A second column of data is read into memory and [A] matrix is now different from an identity matrix in the first two columns, however, it differs from a matrix [a], whose inverse is now on the disk, only in the second column. The [B] matrix from the previous inversion now becomes the [b] matrix for this inversion. This process continues until all the columns of data have been read, at that time the matrix on the disk is the desired inverse of the input matrix.

The common method of attach on problems of systems of simultaneous linear equations is to use a matrix inversion technique. The system

$$a_{11}x_1 + a_{12}x_1 + ... + a_{1n}x_n = c_1$$
$$a_{21}x_1 + a_{22}x_2 + ... + a_{2n}x_n = c_2$$
$$.....$$
$$a_{nn}x_1 + a_{n2}x_2 + ... + a_{nn}x_n = c_n$$

can be represented in matrix form by

$$\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \cdots \\ x_n \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \\ \cdots \\ c_n \end{bmatrix}$$

If we call the coefficient matrix A, the variable or unknown matrix x and the constant matrix c, we have

$$AX = C.$$

If we premultiply both sides by A^{-1}, the inverse of A, we have

$$A^{-1}(AX) = A^{-1}C$$

or

$$(A^{-1}A)X = A^{-1}C$$

$$X = A^{-1}C$$

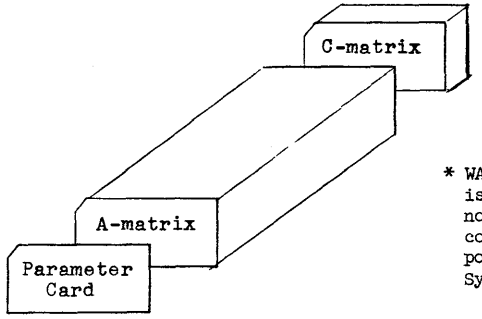
The problem is then to invert the Z matrix and multiply it into the C matrix.

e) Input/Output Formats

The first card contains 1 parameter, the number of equations, punched in the first four columns and right justified. *

The next set of cards is the A or coefficient matrix punched by columns. The format is like the Fortran format 5(E14.7,2X), but unlike Fortran no deviation is allowed. Each new row is to be started on a new card, and all numbers are to be normalized.

If desired, the program will compute the equation solutions. The C matrix is put on cards in the same manner as a column of the A matrix, and it follows the A matrix in input.



* WARNING: If this parameter is greater than 200 or is not right justified in the columns indicated, it is possible for the Monitor System to be destroyed.

Output Format

The incomplete and complete inverse are punched in the same format, 5(E14.7,2X), as the input. The complete inverse has headers between the rows, but the incomplete inverse does not.

The solutions are punched one to a card with the number and solution of each unknown.

f) Restrictions

This program is designed to handle up to 200 simultaneous equations using an IBM 1620 - 1311 system. The program was assembled on a 1620 with 40K storage, automatic floating point hardware, and indirect addressing using SPS-IID. It could be used on a 20K machine with no difficulty and with reassembly, it could be used on machines without the automatic floating point feature.

This program is compatible with Monitor I as it is issued from IBM. The first 20 cylinders of disk storage are used for the 200 equation problem, but for smaller problems, the cylinder usage can be computed by

$$\text{Number of Sectors} = \frac{(\text{Number of Equations})^2}{10}$$

and there are 200 sectors per cylinder.

g) Operating Instructions

1. Cold - Start Monitor I
2. Load Program and input cards into read stacker.
3. Ready Punch
4. Push reader start

Details

Switch Settings

At least one program switch must be on to get any output.

SWITCH 1 - On to make intermediate exit
SWITCH 2 - On to compute and punch equation solutions.
SWITCH 3 - On to restart after intermediate exit.
SWITCH 4 - On to punch completed inverse matrix.

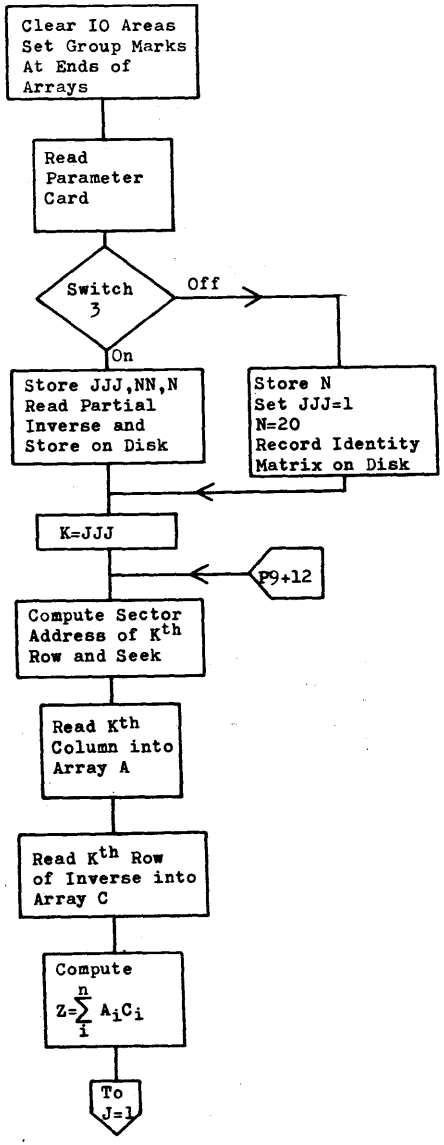
All Check Switches to STOP

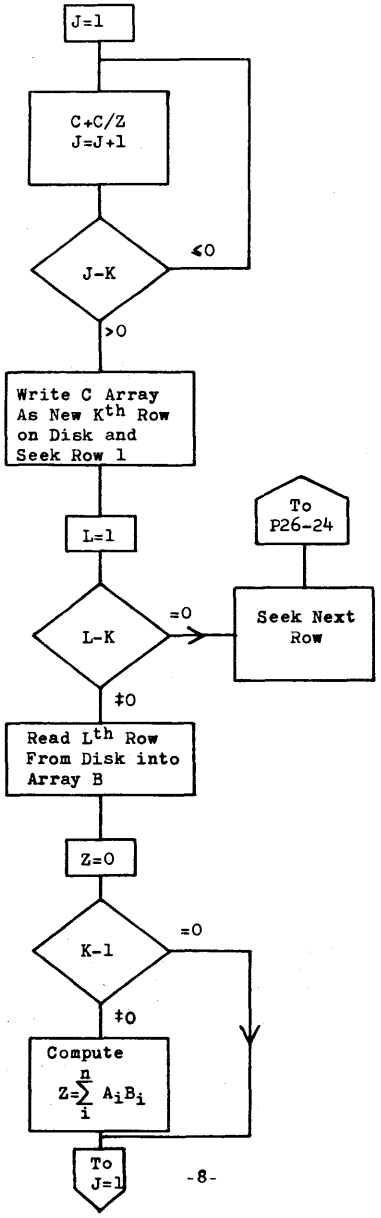
Intermediate Exit

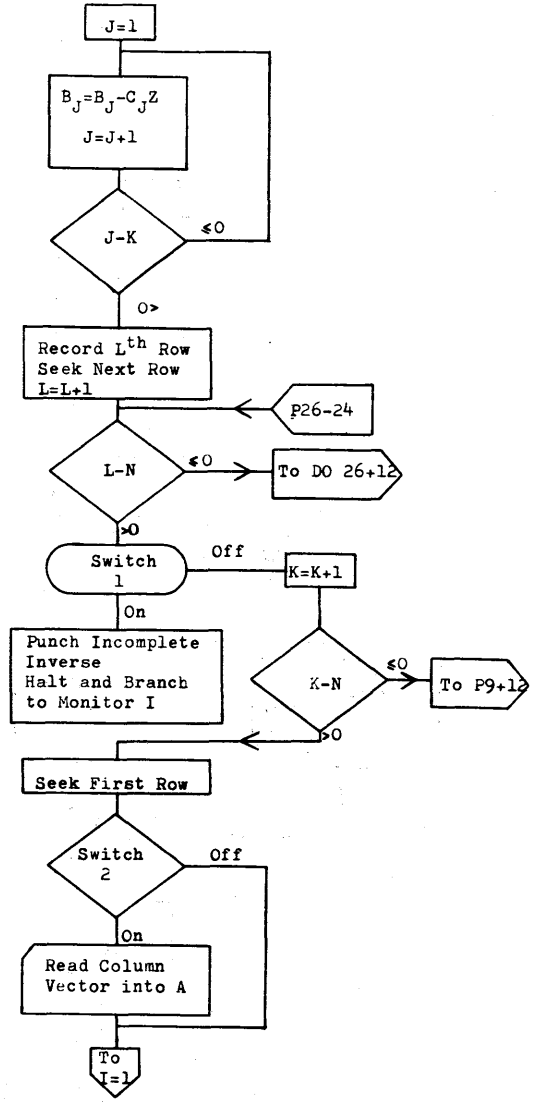
If desired, the program can be stopped during a run and the partially inverted matrix punched for restart later. To do this turn on Switch 1 at the desired stopping point.

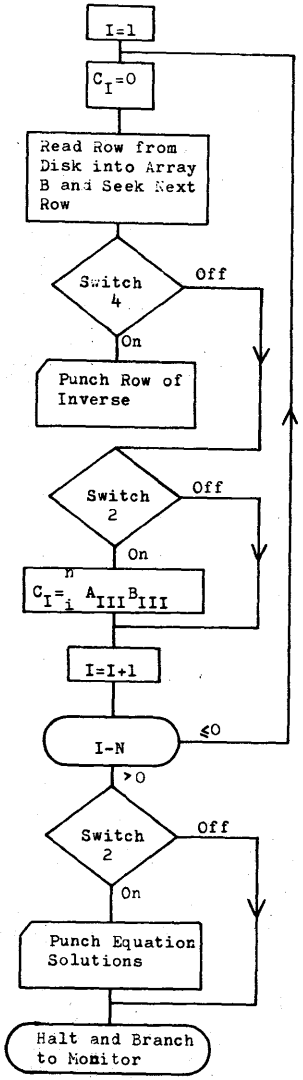
To restart place the incomplete inverse deck in the reader followed by the part of the A matrix not already read by the program. If in doubt, the first card of the incomplete inverse should be printed. It contains 3 parameters, the number of equations, the next column to be read, and the number of sectors per column (always 20).

Flow Chart




J=1
C+C/Z
J=J+1
J-K
≤0
>0
Write C Array
As New K^th Row
on Disk and
Seek Row 1
L=1
To
P26-24
L-K
=0
Seek Next
Row
≠0
Read L^th Row
From Disk into
Array B
Z=0
K-1
=0
≠0
Compute
$Z=\sum_{i}^{n} A_i B_i$
To
J=1


J=1
$B_J=B_J-C_JZ$
J=J+1
J-K
≤0
0>
Record L^th Row
Seek Next Row
L=L+1
P26-24
L-N
≤0
To DO 26+12
>0
Switch
1
Off
K=K+1
On
Punch Incomplete
Inverse
Halt and Branch
to Monitor I
K-N
≤0
To P9+12
>0
Seek First Row
Switch
2
Off
On
Read Column
Vector into A
To
I=1




```
01010*DISK ORIENTED EQUATION SOLVER
01020 START  TFM  *+18,IO-1,,INITIALIZATION                02402 16 02420 -5502
01030        TDM                                           02414 15 00000 00000
01040        AM   *-6,1                                    02426 11 02420 -0001
01050        CM   *-18,IO+158                              02438 14 02420 -5661
01060        BNH  *-36                                     02450 47 02414 01100
01061        TFM  *+18,A-9                                 02462 16 02480 -5688
01062        TDM                                           02474 15 00000 00000
01063        AM   *-6,1                                    02486 11 02480 -0001
01064        CM   *-18,C+1990                              02498 14 02480 J1691
01065        BNH  *-36                                     02510 47 02474 01100
01066        TD   B-11,GM                                  02522 25 07688 05687
01067        TD   C-11,GM                                  02534 25 09690 05687
01068        TD   ONE-11,GM                                02546 25 11692 05687
01070        RNCD IO-1,,,READ PARAMETER CARD               02558 36 05502 00500
01080        SF   IO-1                                     02570 32 05502 00000
01090        BNC3 P1                                       02582 47 02806 00300
01100 P450   SF   IO+4,,,CONTINUATION OF OLD JOB           02594 32 05507 00000
01110        SF   IO+7                                     02606 32 05510 00000
01120        TF   JJJ,IO+2,,  JJJ IS COLUMN TO BE READ NEXT 02618 26 05666 05505
01125        TFM  JJJ-3,0,10                               02630 16 05663 000-0
01130        TFM  NN,20,9,     NN IS SECTOR COUNT          02642 16 05494 00-20
01140        TF   N,IO+10 ,,  N IS NUMBER OF ROWS AND COLUMNS IN MATRIX
                                                           02654 26 05671 05513
01150        TFM  MAT1,0                                   02666 16 05491 -0000
01160        SK   DCF                                      02678 34 05486 00701
01170 DO475  TFM  MM,1,,   READ PARTIAL INVERSE AND        02690 16 05676 -0001
01180        BTM  READ,B,, RECORD ON DISK                  02702 17 11858 -7699
01190        TFM  CORE,B-9                                 02714 16 05499 -7690
01200        WDGN DCF                                      02726 38 05486 00700
01205        A    MAT1,NN                                  02738 21 05491 05494
01206        SK   DCF                                      02750 34 05486 00701
01210        AM   MM,1                                     02762 11 05676 -0001
01220        C    MM,N                                     02774 24 05676 05671
01230 P475   BNH  DO475+12                                02786 47 02702 01100
01240        B7   P9                                       02798 49 03150 00000
01250 P1     TF   N,IO+2,,START OF NEW JOB                 02806 26 05671 05505
02020        TFM  NN,20,9                                  02818 16 05494 00-20
02030        TFM  JJJ,1                                    02830 16 05666 -0001
02040        TFM  MAT1,0                                   02842 16 05491 -0000
02045        TFM  CORE,B-9                                 02854 16 05499 -7690
02050        SK   DCF                                      02866 34 05486 00701
02060        TFL  B,ONE,,  RECORD IDENTITY MATRIX ON DISK  02878 06 07699 11703
02070        TFM  L,2                                      02890 16 05686 -0002
02080        MM   L,10                                     02902 13 05686 -0010
02090        SF   95                                       02914 32 00095 00000
                                                  11
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02100          AM    99,B-10                                    02926 11 00099 -7689
02110          TFL   -99,ZERO                                   02938 06 0009R 11713
02120          AM    L,1                                        02950 11 05686 -0001
02130          C     L,N                                        02962 24 05686 05671
02140          BNH   *-72                                       02974 47 02902 01100
02150          TFM   M,1                                        02986 16 05681 -0001
02160          B7    P6                                         02998 49 03078 00000
02170          MM    M,10                                       03006 13 05681 -0010
02180          SF    95                                         03018 32 00095 00000
02190          AM    99,B-10                                    03030 11 00099 -7689
02200          TFL   -99,ONE                                    03042 06 0009R 11703
02210          SM    99,10                                      03054 12 00099 -0010
02220          TFL   -99,ZERO                                   03066 06 0009R 11713
02230 P6       WDGN  DCF                                        03078 38 05486 00700
02240          A     MAT1,NN                                    03090 21 05491 05494
02245          SK    DCF                                        03102 34 05486 00701
02250          AM    M,1                                        03114 11 05681 -0001
02260          C     M,N                                        03126 24 05681 05671
02270          BNH   *-132                                      03138 47 03006 01100
02275 P9       TF    K,JJJ,,  BEGINNING OF MAIN LOOP            03150 26 11718 05666
02280          TF    FAC,K,,  COMPUTE SECTOR ADDRESS OF         03162 26 11728 11718
02290          SM    FAC,1,,  K TH ROW OF INVERSE               03174 12 11728 -0001
02300          M     FAC,NN                                     03186 23 11728 05494
03010          SF    97                                         03198 32 00097 00000
03030          TF    MAT1,99                                    03210 26 05491 00099
03040          SK    DCF                                        03222 34 05486 00701
03050          BTM   READ,A,,  READ K TH COLUMN OF MATRIX       03234 17 11858 -5697
03060          TFM   CORE,C-9                                   03246 16 05499 -9692
03070          RDGN  DCF                                        03258 36 05486 00700
03090          TFL   Z,ZERO                                     03270 06 11738 11713
03100 D013     TFM   MM,1,,   COMPUTE Z                         03282 16 05676 -0001
03110          MM    MM,10                                      03294 13 05676 -0010
03120          SF    95                                         03306 32 00095 00000
03130          AM    99,C-10                                    03318 11 00099 -9691
03140          TFL   FAC,-99                                    03330 06 11728 0009R
03150          AM    99,A-C                                     03342 11 00099 -400M
03170          FMUL  FAC,-99                                    03354 03 11728 0009R
03180          FADD  Z,FAC                                      03366 01 11738 11728
03190          AM    MM,1                                       03378 11 05676 -0001
03200          C     MM,K                                       03390 24 05676 11718
03210 P13      BNH   D013+12                                    03402 47 03294 01100
03220 D014     TFM   J,1,,    DIVIDE ELEMENTS OF K TH ROW       03414 16 11748 -0001
03230          MM    J,10,,   OF INVERSE BY Z                   03426 13 11748 -0010
03240          SF    95                                         03438 32 00095 00000
03250          AM    99,C-10                                    03450 11 00099 -9691
03260          FDIV  -99,Z                                      03462 09 0009R 11738
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03270          AM    J,1                                        03474 11 11748 -0001
03280          C     J,K                                        03486 24 11748 11718
03290 P14      BNH   D014+12                                    03498 47 03426 01100
03300          TFM   CORE,C-9,,RECORD NEW K TH ROW ON DISK      03510 16 05499 -9692
04010          WDGN  DCF                                        03522 38 05486 00700
04020          TFM   MAT1,0                                     03534 16 05491 -0000
04030          SK    DCF                                        03546 34 05486 00701
04040 D026     TFM   L,1,,    LOOP FOR ADJUSTMENT OF ENTIRE     03558 16 05686 -0001
04050          C     L,K,,    MATRIX                            03570 24 05686 11718
04060          BNE   P20                                        03582 47 03626 01200
04070 P17      A     MAT1,NN                                    03594 21 05491 05494
04080          SK    DCF                                        03606 34 05486 00701
04090          B7    P26-24                                     03618 49 04094 00000
04100 P20      TFM   CORE,B-9                                   03626 16 05499 -7690
04110          RDGN  DCF                                        03638 36 05486 00700
04130          TFL   Z,ZERO                                     03650 06 11738 11713
04140          CM    K,1                                        03662 14 11718 -0001
04150          BZ    P23                                        03674 46 03842 01200
04160 P21      TFM   MM,1,,   COMPUTE Z                         03686 16 05676 -0001
04170          MM    MM,10                                      03698 13 05676 -0010
04180          SF    95                                         03710 32 00095 00000
04190          AM    99,B-10                                    03722 11 00099 -7689
04200          TFL   FAC,-99                                    03734 06 11728 0009R
04210          AM    99,A-B                                     03746 11 00099 -200K
04230          FMUL  FAC,-99                                    03758 03 11728 0009R
04240          FADD  Z,FAC                                      03770 01 11738 11728
04250          AM    MM,1                                       03782 11 05676 -0001
04260          C     MM,K                                       03794 24 05676 11718
04270 P22      BNH   P21+12                                     03806 47 03698 01100
04280          C     L,K                                        03818 24 05686 11718
04290          BNH   P24                                        03830 47 03890 01100
04300 P23      MM    L,10                                       03842 13 05686 -0010
05010          SF    95                                         03854 32 00095 00000
05020          AM    99,A-10                                    03866 11 00099 -5687
05030          FADD  Z,-99                                      03878 01 11738 0009R
05040 P24      TFM   J,1,,    ADJUST J TH ROW                   03890 16 11748 -0001
05050          MM    J,10                                       03902 13 11748 -0010
05060          SF    95                                         03914 32 00095 00000
05070          AM    99,C-10                                    03926 11 00099 -9691
05080          TFL   FAC,-99                                    03938 06 11728 0009R
05090          FMUL  FAC,Z                                      03950 03 11728 11738
05100          MM    J,10                                       03962 13 11748 -0010
05110          SF    95                                         03974 32 00095 00000
05120          AM    99,B-10                                    03986 11 00099 -7689
05130          FSUB  -99,FAC                                    03998 02 0009R 11728
05140          AM    J,1                                        04010 11 11748 -0001
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05150          C     J,K                                    04022 24 11748 11718
05160 P25      BNH   P24+12                                 04034 47 03902 01100
05170          TFM   CORE,B-9,,RECORD J TH ROW              04046 16 05499 -7690
05180          WDGN  DCF                                    04058 38 05486 00700
05185          A     MAT1,NN                                04070 21 05491 05494
               SK    DCF                                    04082 34 05486 00701
05190          AM    L,1                                    04094 11 05686 -0001
05200          C     L,N                                    04106 24 05686 05671
05210 P26      BNH   D026+12                                04118 47 03570 01100
05220          BNC1  P100-24                                04130 47 04566 00100
05230 P30      TFM   MAT1,0,, PUNCH INCOMPLETE INVERSE      04142 16 05491 -0000
05240          SK    DCF                                    04154 34 05486 00701
05250          TF    IM,K                                   04166 26 11753 11718
05260          AM    IM,1                                   04178 11 11753 -0001
05261          BTM   PUNCH+12,400                           04190 17 12326 -0400
05270          BT    KDONNA,IM,,PUNCH IM,NN,N               04202 27 12768 11753
05280          TF    IO+6,WORD+6                            04214 26 05509 11761
05290          BT    KDONNA,NN                              04226 27 12768 05494
05300          TF    IO+14,WORD+6                           04238 26 05517 11761
06010          BT    KDONNA,N                               04250 27 12768 05671
06020          TF    IO+22,WORD+6                           04262 26 05525 11761
06030          BTM   PUNCH                                  04274 17 12314 -0000
06040 D032     TFM   J,1                                    04286 16 11748 -0001
06050          TFM   CORE,B-9                               04298 16 05499 -7690
06060          RDGN  DCF                                    04310 36 05486 00700
06070          A     MAT1,NN                                04322 21 05491 05494
               SK    DCF                                    04334 34 05486 00701
06080          TFM   L,1                                    04346 16 05686 -0001
06090          TFM   *+35,B                                 04358 16 04393 -7699
06100          TFM   *+30,IO+26                             04370 16 04400 -5529
06110          BTFL  DONNA                                  04382 07 12408 00000
06120          TF    ,WORD+26                               04394 26 00000 11781
06130          AM    L,1                                    04406 11 05686 -0001
06140          AM    *-25,10                                04418 11 04393 -0010
06150          AM    *-30,32                                04430 11 04400 -0032
06160          C     L,N                                    04442 24 05686 05671
06170          BH    LC                                     04454 46 04510 01100
06180          CM    *-66,IO+158                            04466 14 04400 -5661
06190          BNH   *-96                                   04478 47 04382 01100
06200          BTM   PUNCH                                  04490 17 12314 -0000
06210          B7    *-132                                  04502 49 04370 00000
06220 LC       BTM   PUNCH                                  04510 17 12314 -0000
06230          AM    J,1                                    04522 11 11748 -0001
06240          C     J,N                                    04534 24 11748 05671
06250 P32      BNH   D032+12                                04546 47 04298 01100
06260          B7    P210                                   04558 49 05462 00000
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06270          AM    K,1                                    04566 11 11718 -0001
06280          C     K,N                                    04578 24 11718 05671
06290 P100     BNH   P9+12,,, END OF MAIN LOOP              04590 47 03162 01100
06300          TFM   MAT1,0                                 04602 16 05491 -0000
07010          SK    DCF                                    04614 34 05486 00701
07020          BNC2  P110                                   04626 47 04650 00200
07030 P105     BTM   READ,A,, READ COLUMN VECTOR FOR EQUATION SOLUTION
                                                            04638 17 11858 -5697
07040 P110     TFM   I,1                                    04650 16 12967 -0001
07050          MM    I,10                                   04662 13 12967 -0010
07060          SF    95                                     04674 32 00095 00000
07070          AM    99,C-10                                04686 11 00099 -9691
07080          TFL   -99,ZERO                               04698 06 0009R 11713
07090          TFM   CORE,B-9                               04710 16 05499 -7690
07100          RDGN  DCF                                    04722 36 05486 00700
07110          A     MAT1,NN                                04734 21 05491 05494
               SK    DCF                                    04746 34 05486 00701
07120          BNC4  P601                                   04758 47 05006 00400
07130 P600     BT    KDONNA,I,,PUNCH ROW OF INVERSE         04770 27 12768 12967
07135          BTM   PUNCH+12,400                           04782 17 12326 -0400
07140          TF    IO+76,LAB1+6                           04794 26 05579 11809
07150          TF    IO+84,WORD+6                           04806 26 05587 11761
07160          BTM   PUNCH                                  04818 17 12314 -0000
07170          TFM   L,1                                    04830 16 05686 -0001
07180          TFM   *+35,B                                 04842 16 04877 -7699
07190          TFM   *+30,IO+26                             04854 16 04884 -5529
07200          BTFL  DONNA                                  04866 07 12408 00000
07210          TF    ,WORD+26                               04878 26 00000 11781
07220          AM    L,1                                    04890 11 05686 -0001
07230          AM    *-25,10                                04902 11 04877 -0010
07240          AM    *-30,32                                04914 11 04884 -0032
07250          C     L,N                                    04926 24 05686 05671
07260          BH    LC1                                    04938 46 04994 01100
07270          CM    *-66,IO+158                            04950 14 04884 -5661
07280          BNH   *-96                                   04962 47 04866 01100
07290          BTM   PUNCH                                  04974 17 12314 -0000
07300          B7    *-132                                  04986 49 04854 00000
08010 LC1      BTM   PUNCH                                  04994 17 12314 -0000
08020 P601     BNC2  P200-24                                05006 47 05186 00200
08030 P120     TFM   III,1,,  COMPUTE EQUATION SOLUTIONS    05018 16 11819 -0001
08040          MM    III,10                                 05030 13 11819 -0010
08050          SF    95                                     05042 32 00095 00000
08060          AM    99,A-10                                05054 11 00099 -5687
08070          TFL   FAC,-99                                05066 06 11728 0009R
08080          AM    99,B-A                                 05078 11 00099 -2002
08100          FMUL  FAC,-99                                05090 03 11728 0009R
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08110          MM    I,10                                  05102 13 12967 -0010
08120          SF    95                                    05114 32 00095 00000
08130          AM    99,C-10                               05126 11 00099 -9691
08140          FADD  -99,FAC                               05138 01 0009R 11728
08150          AM    III,1                                 05150 11 11819 -0001
08160          C     III,N                                 05162 24 11819 05671
08140 P140     BNH   P120+12                               05174 47 05030 01100
08180          AM    I,1                                   05186 11 12967 -0001
08190          C     I,N                                   05198 24 12967 05671
08200 P200     BNH   P110+12                               05210 47 04662 01100
08210          BNC2  P210                                  05222 47 05462 00200
08211          BTM   PUNCH+12,400                          05234 17 12326 -0400
08220 P205     WACD  IO,,,     PUNCH EQUATION SOLUTIONS    05246 39 05503 00400
08230          WACD  IO                                    05258 39 05503 00400
08240          TF    IO+30,LAB2+14                         05270 26 05533 11835
08250          TF    IO+88,LAB3+14                         05282 26 05591 11851
08270          BTM   PUNCH                                 05294 17 12314 -0000
08280          WACD  IO                                    05306 39 05503 00400
08290 DO209    TFM   J,1                                   05318 16 11748 -0001
09060          BT    KDONNA,J                              05330 27 12768 11748
09070          TF    IO+24,WORD+6                          05342 26 05527 11761
09080          MM    J,10                                  05354 13 11748 -0010
09090          SF    95                                    05366 32 00095 00000
09100          AM    99,C-10                               05378 11 00099 -9691
09110          BTFL  DONNA,-99                             05390 07 12408 0009R
09120          TF    IO+94,WORD+26                         05402 26 05597 11781
09180          BTM   PUNCH                                 05414 17 12314 -0000
09190          AM    J,1                                   05426 11 11748 -0001
09200          C     J,N                                   05438 24 11748 05671
09210 P209     BNH   DO209+12                              05450 47 05330 01100
09220 P210     H                                           05462 48 00000 00000
09225          B     796                                   05474 49 00796 00000
09230 DCF      DC    1,1                                   05486 00001
09240 MAT1     DC    5,0                                   05491 00005
09250 NN       DC    3,0                                   05494 00003
09260 CORE     DC    5,0                                   05499 00005
09261          DC    1,-                                   05500 00001
09270 IO       DAS   80                                    05503 00160
09280 JJJ      DS    5                                     05666 00005
09290 N        DS    5                                     05671 00005
09300 MM       DS    5                                     05676 00005
10010 M        DS    5                                     05681 00005
10020 L        DS    5                                     05686 00005
10021 GM       DGM                                         05687 00001
10030 A        DSB   10,200                                05697 02000
10031          DS    2                                     07689 00002
```



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10040 B        DSB   10,200                                07699 02000
10041          DS    2                                     09691 00002
10050 C        DSB   10,200                                09701 02000
10051          DS    2                                     11693 00002
10060          DC    8,10000000                            11701 00008
10070 ONE      DC    2,1                                   11703 00002
10080          DC    8,0                                   11711 00008
10090 ZERO     DC    2,-99                                 11713 00002
10100 K        DS    5                                     11718 00005
10110 FAC      DS    10                                    11728 00010
10120 Z        DS    10                                    11738 00010
10130 J        DS    10                                    11748 00010
10140 IM       DS    5                                     11753 00005
10150 WORD     DAS   24                                    11755 00048
10160 LAB1     DAC   4,ROW ,                               11803 00008
10170 JJ       DS    5                                     11814 00005
10180 III      DS    5                                     11819 00005
10190 LAB2     DAC   8,VARIABLE                            11821 00016
10200 LAB3     DAC   8,SOLUTION                            11837 00016
10220          DORG  *+6                                   11857
10230 READ     TFM   L,1,,SUBROUTINE TO READ ARRAY         11858 16 05686 -0001
10231          RACD  IO                                    11870 37 05503 00500
10240          TFM   IN,IO+26                              11882 16 12952 -5529
10250          TFM   LAST+6,*+20                           11894 16 12312 J1914
10260          B7    EDIT                                  11906 49 12030 00000
10270          TFL   READ-1,WORD+8,6                       11914 06 1185P 11763
10280          AM    L,1                                   11926 11 05686 -0001
10290          AM    READ-1,10                             11938 11 11857 -0010
10300          AM    IN,58                                 11950 11 12952 -0058
11010          C     L,N                                   11962 24 05686 05671
11020          BNH   *+24                                  11974 47 11998 01100
11030          BB                                          11986 42 00000 00000
11040          CM    IN,IO+158                             11998 14 12952 -5661
11050          BNH   READ+36                               12010 47 11894 01100
11051          B7    READ+12                               12022 49 11870 00000
11060 EDIT     TFL   WORD+8,ZEROS                          12030 06 11763 12962
11070          SF    WORD+7                                12042 32 11762 00000
11080          TNS   -IN,WORD+8                            12054 72 1295K 11763
11090          SM    IN,5                                  12066 12 12952 -0005
11100          SF    -IN                                   12078 32 1295K 00000
11110          AM    IN,1                                  12090 11 12952 -0001
11120          CM    -IN,20,10                             12102 14 1295K 000K0
11130          BNE   *+24                                  12114 47 12138 01200
11140          SF    WORD+8                                12126 32 11763 00000
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11150          SM    IN,4                          12138 12 12952 -0004
11160          SF    WORD                          12150 32 11755 00000
11170          TNS   -IN,WORD+6                    12162 72 1295K 11761
11180          CF    WORD                          12174 33 11755 00000
11190          SM    IN,16                         12186 12 12952 -0016
11200          TD    WORD-1,-IN                    12198 25 11754 1295K
11210          SF    WORD-1                        12210 32 11754 00000
11220          SM    IN,3                          12222 12 12952 -0003
11230          SF    -IN                           12234 32 1295K 00000
11240          AM    IN,1                          12246 11 12952 -0001
11250          CM    -IN,20,10                     12258 14 1295K 000K0
11260          BNZ   *+24                          12270 47 12294 01200
11270          SF    WORD+6                        12282 32 11761 00000
11271          AM    WORD+8,1,10                   12294 11 11763 000-1
11280 LAST     B7                                  12306 49 00000 00000
11290 PUNCH    WACD  IO                            12314 39 05503 00400
11300          TFM   *+18,IO-1                     12326 16 12344 -5502
12010          TDM                                 12338 15 00000 00000
12020          AM    *-6,1                         12350 11 12344 -0001
12030          CM    *-18,IO+158                   12362 14 12344 -5661
12040          BNH   *-36                          12374 47 12338 01100
12050          BB                                  12386 42 00000 00000
12060          DORG  *+10                          12407
12070 DONNA    TFM   *+30,WORD-2                   12408 16 12438 J1753
12080          AM    *+18,1                        12420 11 12438 -0001
12090          TDM                                 12432 15 00000 00000
12100          CM    *-6,WORD+46                   12444 14 12438 J1801
12110          BL    *-36                          12456 47 12420 01300
12111          CM    DONNA-1,-99,10                12468 14 12407 000RR
12112          BE    *+24                          12480 46 12504 01200
12113          SM    DONNA-1,1,10                  12492 12 12407 000-1
12114          TFM   WORD+22,10,10                 12504 16 11777 000J0
12120          BNF   *+24,DONNA-1                  12516 44 12540 12407
12130          TFM   WORD+22,20,10                 12528 16 11777 000K0
12131          CF    WORD+21                       12540 33 11776 00000
12140          CF    DONNA-1                       12552 33 12407 00000
12141          TFM   WORD+20,45,10                 12564 16 11775 000M5
12142          CF    WORD+19                       12576 33 11774 00000
12150          TNF   WORD+26,DONNA-1               12588 73 11781 12407
12151          CF    WORD+23                       12600 33 11778 00000
12160          SF    DONNA-9                       12612 32 12399 00000
12170          BNF   *+36,DONNA-3                  12624 44 12660 12405
12180          TFM   WORD,20,10                    12636 16 11755 000K0
12190          CF    DONNA-3                       12648 33 12405 00000
12191          SF    WORD-1                        12660 32 11754 00000
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12200          TNF   WORD+18,DONNA-3               12672 73 11773 12405
12201          CF    WORD+5                        12684 33 11760 00000
12210          TFM   WORD+4,3,10                   12696 16 11759 000-3
12211          CF    WORD+3                        12708 33 11758 00000
12220          TD    WORD+2,DONNA-10               12720 25 11757 12398
12230          TDM   WORD+1,7                      12732 15 11756 00007
12235          CF    WORD+2                        12744 33 11757 00000
12240          BB                                  12756 42 00000 00000
12250 KDONNA   SF    KDONNA-4                      12768 32 12764 00000
12260          TFM   *+18,WORD-1                   12780 16 12798 J1754
12270          TDM                                 12792 15 00000 00000
12280          AM    *-6,1                         12804 11 12798 -0001
12290          CM    *-18,WORD+46                  12816 14 12798 J1801
12300          BNH   *-36                          12828 47 12792 01100
13010          TFM   IN,KDONNA-4                   12840 16 12952 J2764
13020          BD    *+48,-IN                      12852 43 12900 1295K
13030          AM    IN,1                          12864 11 12952 -0001
13040          CM    IN,KDONNA-3                   12876 14 12952 J2765
13050          BNH   *-36                          12888 47 12852 01100
13060          SF    -IN                           12900 32 1295K 00000
13070          TNF   WORD+6,KDONNA-1               12912 73 11761 12767
13075          SF    WORD-1                        12924 32 11754 00000
13080          BB                                  12936 42 00000 00000
13090 IN       DS    5                             12952 00005
13100 ZEROS    DC    10,0                          12962 00010
13101 I        DS    5                             12967 00005
13200          DEND  START                         02402
```

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ZZXFQ                    5
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20

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R9999Z0000000000000000000000000000000000000000000000000000000000000000000000068
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21

SAMPLE PROBLEM INPUT

18

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1.6565215E-03	0.0000000E-99	1.7610484E-03	0.0000000E-99	1.7087850E-03
0.0000000E-99	1.6396969E-03	0.0000000E-99	1.6565241E-03	0.0000000E-99
1.6396982E-03	0.0000000E-99	1.6042594E-03		
-1.9032720E-03	4.7993824E-04	-1.7610472E-03	0.0000000E-99	-1.6565215E-03
0.0000000E-99	-1.7610484E-03	0.0000000E-99	-1.7087850E-03	0.0000000E-99
-1.6396969E-03	0.0000000E-99	-1.6565241E-03	0.0000000E-99	-1.6396982E-03
0.0000000E-99	-1.6042594E-03	0.0000000E-99		
0.0000000E-99	1.7610472E-03	4.7993824E-04	1.9032695E-03	0.0000000E-99
1.7610446E-03	0.0000000E-99	1.7087850E-03	0.0000000E-99	1.7610458E-03
0.0000000E-99	1.7087824E-03	0.0000000E-99	1.6396982E-03	0.0000000E-99
1.6565215E-03	0.0000000E-99	1.6396956E-03		
-1.7610472E-03	0.0000000E-99	-1.9032695E-03	4.7993824E-04	-1.7610446E-03
0.0000000E-99	-1.7087850E-03	0.0000000E-99	-1.7610458E-03	0.0000000E-99
-1.7087824E-03	0.0000000E-99	-1.6396982E-03	0.0000000E-99	-1.6565215E-03
0.0000000E-99	-1.6396956E-03	0.0000000E-99		
0.0000000E-99	1.6565215E-03	0.0000000E-99	1.7610446E-03	4.7993824E-04
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0.0000000E-99	1.7610433E-03	0.0000000E-99	1.6042594E-03	0.0000000E-99
1.6396956E-03	0.0000000E-99	1.6565189E-03		
-1.6565215E-03	0.0000000E-99	-1.7610446E-03	0.0000000E-99	-1.9032670E-03
4.7993824E-04	-1.6396969E-03	0.0000000E-99	-1.7087824E-03	0.0000000E-99
-1.7610433E-03	0.0000000E-99	-1.6042594E-03	0.0000000E-99	-1.6396956E-03
0.0000000E-99	-1.6565189E-03	0.0000000E-99		
0.0000000E-99	1.7610484E-03	0.0000000E-99	1.7087850E-03	0.0000000E-99
1.6396969E-03	4.7993824E-04	1.9032720E-03	0.0000000E-99	1.7610472E-03
0.0000000E-99	1.6565215E-03	0.0000000E-99	1.7610484E-03	0.0000000E-99
1.7087850E-03	0.0000000E-99	1.6396969E-03		
-1.7610484E-03	0.0000000E-99	-1.7087850E-03	0.0000000E-99	-1.6396969E-03
0.0000000E-99	-1.9032720E-03	4.7993824E-04	-1.7610472E-03	0.0000000E-99
-1.6565215E-03	0.0000000E-99	-1.7610484E-03	0.0000000E-99	-1.7087850E-03
0.0000000E-99	-1.6396969E-03	0.0000000E-99		
0.0000000E-99	1.7087850E-03	0.0000000E-99	1.7610458E-03	0.0000000E-99
1.7087824E-03	0.0000000E-99	1.7610472E-03	4.7993824E-04	1.9032695E-03
0.0000000E-99	1.7610446E-03	0.0000000E-99	1.7087850E-03	0.0000000E-99
1.7610458E-03	0.0000000E-99	1.7087824E-03		
-1.7087850E-03	0.0000000E-99	-1.7610458E-03	0.0000000E-99	-1.7087824E-03
0.0000000E-99	-1.7610472E-03	0.0000000E-99	-1.9032695E-03	4.7993824E-04
-1.7610446E-03	0.0000000E-99	-1.7087850E-03	0.0000000E-99	-1.7610458E-03
0.0000000E-99	-1.7087824E-03	0.0000000E-99		
0.0000000E-99	1.6396969E-03	0.0000000E-99	1.7087824E-03	0.0000000E-99

22

1.7610433E-03	0.0000000E-99	1.6565215E-03	0.0000000E-99	1.7610446E-03
4.7993824E-04	1.9032670E-03	0.0000000E-99	1.6396969E-03	0.0000000E-99
1.7087824E-03	0.0000000E-99	1.7610433E-03		
-1.6396969E-03	0.0000000E-99	-1.7087824E-03	0.0000000E-99	-1.7610433E-03
0.0000000E-99	-1.6565215E-03	0.0000000E-99	-1.7610446E-03	0.0000000E-99
-1.9032670E-03	4.7993824E-04	-1.6396969E-03	0.0000000E-99	-1.7087824E-03
0.0000000E-99	-1.7610433E-03	0.0000000E-99		
0.0000000E-99	1.6565241E-03	0.0000000E-99	1.6396982E-03	0.0000000E-99
1.6042594E-03	0.0000000E-99	1.7610484E-03	0.0000000E-99	1.7087850E-03
0.0000000E-99	1.6396969E-03	4.7993824E-04	1.9032720E-03	0.0000000E-99
1.7610472E-03	0.0000000E-99	1.6565215E-03		
-1.6565241E-03	0.0000000E-99	-1.6396982E-03	0.0000000E-99	-1.6042594E-03
0.0000000E-99	-1.7610484E-03	0.0000000E-99	-1.7087850E-03	0.0000000E-99
-1.6396969E-03	0.0000000E-99	-1.9032720E-03	4.7993824E-04	-1.7610472E-03
0.0000000E-99	-1.6565215E-03	0.0000000E-99		
0.0000000E-99	1.6396982E-03	0.0000000E-99	1.6565215E-03	0.0000000E-99
1.6396956E-03	0.0000000E-99	1.7087850E-03	0.0000000E-99	1.7610458E-03
0.0000000E-99	1.7087824E-03	0.0000000E-99	1.7610472E-03	4.7993824E-04
1.9032695E-03	0.0000000E-99	1.7610446E-03		
-1.6396982E-03	0.0000000E-99	-1.6565215E-03	0.0000000E-99	-1.6396956E-03
0.0000000E-99	-1.7087850E-03	0.0000000E-99	-1.7610458E-03	0.0000000E-99
-1.7087824E-03	0.0000000E-99	-1.7610472E-03	0.0000000E-99	-1.9032695E-03
4.7993824E-04	-1.7610446E-03	0.0000000E-99		
0.0000000E-99	1.6042594E-03	0.0000000E-99	1.6396956E-03	0.0000000E-99
1.6565189E-03	0.0000000E-99	1.6396969E-03	0.0000000E-99	1.7087824E-03
0.0000000E-99	1.7610433E-03	0.0000000E-99	1.6565215E-03	0.0000000E-99
1.7610446E-03	4.7993824E-04	1.9032670E-03		
-1.6042594E-03	0.0000000E-99	-1.6396956E-03	0.0000000E-99	-1.6565189E-03
0.0000000E-99	-1.6396969E-03	0.0000000E-99	-1.7087824E-03	0.0000000E-99
-1.7610433E-03	0.0000000E-99	-1.6565215E-03	0.0000000E-99	-1.7610446E-03
0.0000000E-99	-1.9032670E-03	4.7993824E-04		
1.0000000E 00	0.0000000E-99	1.0000000E 00	0.0000000E-99	1.0000000E 00
0.0000000E-99	1.0000000E 00	0.0000000E-99	1.0000000E 00	0.0000000E-99
1.0000000E 00	0.0000000E-99	1.0000000E 00	0.0000000E-99	1.0000000E 00
0.0000000E-99	1.0000000E 00	0.0000000E-99	1.0000000E 00	0.0000000E-99

ROW 01

1.4663088E+03	6.4575447E+02	-3.7460682E+02	7.4650562E+01	-1.7415282E+02
-1.0352652E+02	-3.7460671E+02	7.4649988E+01	-1.9078022E+02	-1.0279811E+02
-6.6636106E+01	-1.4405735E+02	-1.7415323E+02	-1.0352619E+02	-6.6636326E+01
-1.4405730E+02	-2.4905622E+01	-1.2756122E+02		

ROW 02

-6.4575471E+02	1.4663081E+03	-7.4650132E+01	-3.7460676E+02	1.0352640E+02
-1.7415280E+02	-7.4649721E+01	-3.7460666E+02	1.0279783E+02	-1.9078033E+02
1.4405717E+02	-6.6636169E+01	1.0352602E+02	-1.7415317E+02	1.4405717E+02
-6.6636074E+01	1.2756163E+02	-2.4905419E+01		

ROW 03

-3.7460681E+02	7.4650122E+01	1.5711990E+03	5.3158088E+02	-3.7460658E+02
7.4650309E+01	-1.9842538E+02	-9.1783324E+01	-2.4531693E+02	9.9868300E-01
-1.9842532E+02	-9.1782920E+01	-6.6636404E+01	-1.4405733E+02	-5.2650675E+01
-1.4754309E+02	-6.6636040E+01	-1.4405724E+02		

ROW 04

-7.4650461E+01	-3.7460686E+02	-5.3158137E+02	1.5711986E+03	-7.4650360E+01
-3.7460661E+02	9.1783166E+01	-1.9842558E+02	-9.9850790E-01	-2.4531696E+02
9.1783322E+01	-1.9842512E+02	1.4405749E+02	-6.6636314E+01	1.4754307E+02
-5.2650584E+01	1.4405755E+02	-6.6635884E+01		

ROW 05

-1.7415292E+02	-1.0352619E+02	-3.7460669E+02	7.4650445E+01	1.4663088E+03
6.4575518E+02	-6.6636011E+01	-1.4405764E+02	-1.9077998E+02	-1.0279795E+02
-3.7460646E+02	7.4650378E+01	-2.4905406E+01	-1.2756134E+02	-6.6636140E+01
-1.4405719E+02	-1.7415260E+02	-1.0352591E+02		

ROW 06

1.0352616E+02	-1.7415296E+02	-7.4650439E+01	-3.7460671E+02	-6.4575552E+02
1.4663088E+03	1.4405748E+02	-6.6636039E+01	1.0279829E+02	-1.9078010E+02
-7.4650154E+01	-3.7460650E+02	1.2756138E+02	-2.4905321E+01	1.4405729E+02
-6.6636070E+01	1.0352571E+02	-1.7415255E+02		

ROW 07

-3.7460671E+02	7.4649902E+01	-1.9842536E+02	-9.1783295E+01	-6.6636318E+01
-1.4405726E+02	1.5711990E+03	5.3158069E+02	-2.4531715E+02	9.9876500E-01
-5.2650722E+01	-1.4754312E+02	-3.7460684E+02	7.4650184E+01	-1.9842552E+02
-9.1783250E+01	-6.6636270E+01	-1.4405735E+02		

ROW 08

-7.4650069E+01	-3.7460695E+02	9.1783092E+01	-1.9842557E+02	1.4405716E+02
-6.6636439E+01	-5.3158119E+02	1.5711986E+03	-9.9867610E-01	-2.4531720E+02
1.4754326E+02	-5.2650556E+01	-7.4649847E+01	-3.7460674E+02	9.1783371E+01
-1.9842532E+02	1.4405762E+02	-6.6635987E+01		

ROW 09

-1.9078043E+02	-1.0279786E+02	-2.4531705E+02	9.9865530E-01	-1.9078013E+02
-1.0279773E+02	-2.4531715E+02	9.9871160E-01	1.7090600E+03	4.5992369E+02
-2.4531696E+02	9.9889500E-01	-1.9078038E+02	-1.0279791E+02	-2.4531690E+02
9.9856500E-01	-1.9078006E+02	-1.0279789E+02		

ROW 10

1.0279799E+02	-1.9078048E+02	-9.9853900E-01	-2.4531700E+02	1.0279769E+02
-1.9078006E+02	-9.9848400E-01	-2.4531709E+02	-4.5992412E+02	1.7090599E+03
-9.9883000E-01	-2.4531697E+02	1.0279773E+02	-1.9078034E+02	-9.9844900E-01
-2.4531695E+02	1.0279788E+02	-1.9078012E+02		

ROW 11

-6.6636208E+01	-1.4405735E+02	-1.9842539E+02	-9.1783212E+01	-3.7460651E+02
7.4650295E+01	-5.2650751E+01	-1.4754308E+02	-2.4531727E+02	9.9929000E-01
1.5711988E+03	5.3158152E+02	-6.6635904E+01	-1.4405770E+02	-1.9842502E+02
-9.1783235E+01	-3.7460622E+02	7.4650304E+01		

ROW 12

1.4405748E+02	-6.6636059E+01	9.1782980E+01	-1.9842528E+02	-7.4650240E+01
-3.7460648E+02	1.4754315E+02	-5.2650645E+01	-9.9896500E-01	-2.4531733E+02
-5.3158175E+02	1.5711989E+03	1.4405751E+02	-6.6636000E+01	9.1783167E+01
-1.9842520E+02	-7.4650220E+01	-3.7460642E+02		

ROW 13

-1.7415305E+02	-1.0352627E+02	-6.6636157E+01	-1.4405742E+02	-2.4905349E+01
-1.2756150E+02	-3.7460688E+02	7.4650094E+01	-1.9078033E+02	-1.0279804E+02
-6.6636266E+01	-1.4405721E+02	1.4663086E+03	6.4575474E+02	-3.7460701E+02
7.4650331E+01	-1.7415290E+02	-1.0352640E+02		

ROW 14

1.0352633E+02	-1.7415331E+02	1.4405762E+02	-6.6636246E+01	1.2756160E+02
-2.4905331E+01	-7.4650053E+01	-3.7460692E+02	1.0279782E+02	-1.9078025E+02
1.4405739E+02	-6.6636280E+01	-6.4575497E+02	1.4663087E+03	-7.4650269E+01
-3.7460682E+02	1.0352623E+02	-1.7415284E+02		

ROW 15

-6.6636448E+01	-1.4405744E+02	-5.2650617E+01	-1.4754318E+02	-6.6636081E+01
-1.4405719E+02	-1.9842575E+02	-9.1782889E+01	-2.4531698E+02	9.9858700E-01
-1.9842514E+02	-9.1783117E+01	-3.7460697E+02	7.4650370E+01	1.5711991E+03
5.3158078E+02	-3.7460642E+02	7.4650187E+01		

ROW 16

1.4405741E+02	-6.6635963E+01	1.4754329E+02	-5.2650646E+01	1.4405728E+02
-6.6636120E+01	9.1783150E+01	-1.9842575E+02	-9.9848600E-01	-2.4531693E+02
9.1783044E+01	-1.9842511E+02	-7.4650249E+01	-3.7460705E+02	-5.3158132E+02
1.5711989E+03	-7.4650180E+01	-3.7460667E+02		

ROW 17

-2.4905246E+01	-1.2756135E+02	-6.6635970E+01	-1.4405744E+02	-1.7415252E+02
-1.0352599E+02	-6.6636280E+01	-1.4405766E+02	-1.9078030E+02	-1.0279773E+02
-3.7460657E+02	7.4650430E+01	-1.7415299E+02	-1.0352592E+02	-3.7460661E+02
7.4650420E+01	1.4663090E+03	6.4575500E+02		

ROW 18

1.2756157E+02	-2.4905077E+01	1.4405743E+02	-6.6635999E+01	1.0352625E+02
-1.7415264E+02	1.4405735E+02	-6.6636260E+01	1.0279760E+02	-1.9078034E+02
-7.4650438E+01	-3.7460659E+02	1.0352623E+02	-1.7415307E+02	-7.4650306E+01
-3.7460659E+02	-6.4575543E+02	1.4663090E+03		

VARIABLE	SOLUTION
01	1.9830998E+01
02	-6.9528340E+01
03	-6.1050400E+00
04	-6.2656100E+01
05	1.9832610E+01
06	-6.9529790E+01
07	-6.1058000E+00
08	-6.2655270E+01
09	-3.5329000E+01
10	-5.2727110E+01
11	-6.1044400E+00
12	-6.2656883E+01
13	1.9830690E+01
14	-6.9528290E+01
15	-6.1052200E+00
16	-6.2656050E+01
17	1.9832600E+01
18	-6.9529730E+01