```
      SUBROUTINE ZERO (C,V)                                          L001
      IMPLICIT REAL * 8 ( A-H, O-Z )                                 L002
      COMMON /B0/ AL,BL,HX2,HY2,HXY,HX,HY,HXT2,HYT2                  L003
      COMMON /B1/ NUM,NX4,NX3,NX2,NX1,NY3,NY2,NY1                    L004
      DIMENSION C(1),CXX(1),CXY(1),CYY(1),V(NY3,1)                   L005
C                                                                    L006
C                                                                    L007
CCCCCC     DISTRIBUTE COLUMN ARRAY INTO PLANE ARRAY.                 L008
C                                                                    L009
C                                                                    L010
      II = 1                                                         L011
      DO 150 I =2,NY2                                                L012
          DO 140 J = 2 , NX2                                         L013
              V(I,J) = C(II)                                         L014
              II = II + 1                                            L015
  140     CONTINUE                                                   L016
  150 CONTINUE                                                       L017
      DO 160 J = 2 , NX2                                             L018
          V(1,J) = V(3,J)                                            L019
  160 CONTINUE                                                       L020
      DO 170 I = 1 , NY2                                             L021
          V(I,1) = V(I,3)                                            L022
  170 CONTINUE                                                       L023
      GO TO 300                                                      L024
C                                                                    L025
C                                                                    L026
C                                                                    L027
      ENTRY FIRST (CXX,CYY,V)                                        L028
C                                                                    L029
C                                                                    L030
CCCCCC     FINITE DIFFERENCE APPROXIMATION OF                        L031
C          THE FIRST DERIVATIVE OF A FUNCTION.                       L032
C                                                                    L033
C                                                                    L034
      DO 210 I = 2 , NY2                                             L035
          K = (I-2)*NX1                                              L036
          DO 200 J = 2 , NX2                                         L037
              II = K + J -1                                          L038
              CXX(II) = HXT2 * (V(I,J+1)-V(I,J-1))**2                L039
              CYY(II) = HYT2 * (V(I+1,J)-V(I-1,J))**2                L040
  200     CONTINUE                                                   L041
  210 CONTINUE                                                       L042
      GO TO 300                                                      L043
C                                                                    L044
C                                                                    L045
C                                                                    L046
      ENTRY SECOND (CXX,CXY,CYY,V)                                   L047
C                                                                    L048
C                                                                    L049
CCCCCC     FINITE DIFFERENCE APPROXIMATION OF                        L050
C          THE SECOND DERIVATIVE OF A FUNCTION.                      L051
C                                                                    L052
```

```
C                                                                       L053
      DO 250 I = 2 , NY2                                                L054
          K = (I-2)*NX1                                                 L055
          DO 240 J = 2 , NX2                                            L056
              II = K + J -1                                             L057
              CXX(II) = (V(I,J+1) - 2.*V(I,J)                           L058
     1                  + V(I,J-1)) / HX2                              L059
              CYY(II) = (V(I+1,J) - 2.*V(I,J)                           L060
     1                  + V(I-1,J)) / HY2                              L061
              CXY(II) = (V(I+1,J+1) - V(I+1,J-1)                        L062
     1                  - V(I-1,J+1) + V(I-1,J-1))/HXY                  L063
  240     CONTINUE                                                      L064
  250 CONTINUE                                                          L065
  300 RETURN                                                            L066
      END                                                               L067
```

```
      SUBROUTINE STRESS (W,WXX,WXY,WYY,FXX,FXY,FYY                    M001
     1                  ,SBX,SBY,SBXY,IB)                            M002
      IMPLICIT REAL * 8 (A-H,O-Z)                                     M003
      COMMON /B1/ NUM                                                 M004
      COMMON /B2/ RF,V,VS,D,PR                                        M005
      COMMON /B4/ T2                                                  M006
      DIMENSION W(1),WXX(1),WXY(1),WYY(1),FXX(1),FXY(1)               M007
     1          ,FYY(1),SBX(1),SBY(1),SBXY(1),IB(1)                  M008
C                                                                     M009
C                                                                     M010
CCCCCC     FIGURE OUT THE BENDING STRESSES AT THE                     M011
C          BOTTOM OF THE PLATE, THEN PRINTOUT THE                     M012
C          BENDING AND THE MEMBRANE STRESSES.                         M013
C                                                                     M014
C                                                                     M015
      LC = 0                                                          M016
      WRITE (6,900)                                                   M017
      DO 50 I = 1 , NUM                                               M018
          SBX(I) = -D * (WXX(I) + PR*WYY(I)) / T2                     M019
          SBY(I) = -D * (WYY(I) + PR*WXX(I)) / T2                     M020
          SBXY(I) = -D * (1.-PR) * WXY(I) / T2                        M021
          CFXY = - FXY(I)                                             M022
          IF (LC .NE. 53) GO TO 20                                    M023
          LC = 0                                                      M024
          WRITE (6,910)                                               M025
          WRITE (6,900)                                               M026
   20     LC = LC + 1                                                 M027
          WRITE (6,920) I,IB(I),W(I),SBX(I),SBY(I)                    M028
     1                 ,SBXY(1),FYY(1),FXX(I),CFXY                  M029
   50 CONTINUE                                                        M030
C                                                                     M031
C                                                                     M032
C                                                                     M033
      RETURN                                                          M034
C                                                                     M035
C                                                                     M036
  900 FORMAT (1H1,1X,'(NOTE:  *-BOUNDARY POINTS',                     M037
     1  ', **-CORNER POINT)'///1X,                                     M038
     2  'NODE',6X,'DEFLECTION',9X,'BENDING STRESSES',                  M039
     3   13X,'SHEARING',8X,                                           M040
     4  'MEMBRANE STRESSES IN THE MIDDLE SURFACE' /                    M041
     5   26X, 'X-DIRECTION     Y-DIRECTION        ',                  M042
     6  'STRESS          X-DIRECTION',                               M043
     7  '      Y-DIRECTION      SHEARING'/)                          M044
  910 FORMAT (1H0,30X,'(CONTINUED)')                                  M045
  920 FORMAT (I5,A4,7(E13.6,3X))                                      M046
      END                                                             M047
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```
      SUBROUTINE TITLE (W1,QT,NT,KK)                                    N001
      IMPLICIT REAL * 8 (A-H,O-Z)                                       N002
      COMMON /B0/ AL,BL                                                 N003
      COMMON /B1/ NUM,NX4,NX3,NX2,NX1,NY3,NY2,NY1,NX,NYN004
      COMMON /B2/ RF,V,VS,D,PR                                          N005
      COMMON /B3/ TH,RC,SOVERD,TOVERD,EHX4,Q(8),ELAS                    N006
     1           ,LINC,LORNL                                            N007
      COMMON /B4/ T2,SN,CN,STIF,IDIS,IPRI,IREF,NBC                      N008
     1           ,ITITLE(12)                                            N009
      DIMENSION NSC(4,4),NL(4,2)                                        N010
      DATA NSC /'SIMP','LY S','UPPO','RTED'                             N011
     1         ,'ELAS','TIC ','SUPP','ORT '                           N012
     2         ,'FREE',' EDG','ES  ','    '                           N013
     3         ,'BEAM',' SUP','PORT','ED  '/                          N014
      DATA NL /'LINE','AR T','YPE ','    '                           N015
     1        ,'NONL','INEA','R TY','PE  '/                           N016
C                                                                       N017
C                                                                       N018
CCCCCC     PRINT THE TITLE AND NECESSARY DATA AT                        N019
C          THE FIRST PAGE.                                              N020
C                                                                       N021
C                                                                       N022
      QT = QT * TH                                                      N023
      CF = -2. * D * (1.-PR) * W1                                       N024
      WRITE (6,300) ITITLE,(NSC(I,NBC),I=1,4)                           N025
     1             ,(NL(I,LORNL),I=1,4),NX,NY,LINC                    N026
      WRITE (6,315) NT,KK,IPRI,IDIS                                     N027
      WRITE (6,325) AL,BL,ELAS,PR,TH,D,STIF,QT,CF                       N028
      GO TO 100                                                         N029
C                                                                       N030
C                                                                       N031
      ENTRY REF (QT,W2,W3,W4,W5,W6)                                     N032
C                                                                       N033
C                                                                       N034
CCCCCC     PRINTOUT THE REFERENCE DATA.                                 N035
C                                                                       N036
C                                                                       N037
      WNON = W2 / TH                                                    N038
      QNON = QT * CN                                                    N039
      SBXN1 = -D * (W3 + PR*W4) / T2 * SN                               N040
      SMXN1 = W5 * SN                                                   N041
      SMYN4 = W6 * SN                                                   N042
      BXY3 = -CF / 2. / T2 * SN                                         N043
      WRITE (6,350) WNON,QNON,SBXN1,SMXN1,SMYN4,BXY3                    N044
C                                                                       N045
  100 RETURN                                                            N046
C                                                                       N047
  300 FORMAT (1H1,64(1H*) / 1X,1H*,62X,1H*                              N048
     1  / ' *****   ',12A4,'   *****'                                   N049
     2  / 1X,1H*,62X,1H* / 1X,64(1H*)/                                 N050
     3  '0(NOTE:   PRESSURE IN PSI, FORCE IN ',                        N051
     4    'POUNDS, LENGTH IN INCHES.)'/                                N052
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     5  '0TYPE OF SUPPORT ........................',    N053
     6        '....... ',4A4 /                            N054
     7  '0TYPE OF PROBLEM ........................',    N055
     8        '....... ',4A4 /                            N056
     9  '0NUMBER OF SEGMENTS IN X-DIRECTION ......',    N057
     A        '............',I10 /                        N058
     B  '0NUMBER OF SEGMENTS IN Y-DIRECTION ......',    N059
     C        '............',I10 /                        N060
     D  '0NUMBER OF LOAD INCREMENTS ..............',    N061
     E        '............',I10 )                       N062
   315 FORMAT (                                          N063
     1  '0NUMBER OF LOAD INCREMENT OF PRESENT CASE',    N064
     2        ' ............',I10 /                       N065
     3  '0ITERATION TIMES OF PRESENT CASE .........',    N066
     4        '............',I10 /                        N067
     5  '0PRINCIPAL STRESSES OUTPUT INCREMENT ....',    N068
     6        '............',I10 /                        N069
     7  '0IN-PLANE DISPLACEMENT OUTPUT INCREMENT .',    N070
     8        '............',I10)                        N071
   325 FORMAT (                                          N072
     1  '0HALF LENGTH OF PLATE (A) IN X-DIRECTION ',    N073
     2        '............',E12.5 /                      N074
     3  '0HALF LENGTH OF PLATE (B) IN Y-DIRECTION ',    N075
     4        '............',E12.5 /                      N076
     5  '0MODULUS OF ELASTICITY OF PLATE .........',    N077
     6        '............',E12.5 /                      N078
     7  '0POISSON"S RATIO OF PLATE ................',    N079
     8        '............',E12.5 /                      N080
     9  '0THICKNESS OF PLATE ......................',    N081
     A        '............',E12.5 /                      N082
     B  '0FLEXURAL RIGIDITY OF THE PLATE .........',    N083
     C        '............',E12.5 /                      N084
     D  '0MODULUS K USED ON THE BOUNDARY .........',    N085
     E        '............',E12.5 /                      N086
     F  '0MAGNITUDE OF LOAD OF PRESENT CASE ......',    N087
     G        '............',E12.5 /                      N088
     H  '0REACTION FORCE AT CORNER POINT .........',    N089
     I        '............',E12.5 / )                    N090
   350 FORMAT (1H0,15X,'***** REFERENCE DATA *****'//    N091
     1  '0WIDTH / THICKNESS ........................',    N092
     2        '............',E12.5 /                      N093
     3  '0 (Q/E) * (A/T) ** 4 ......................',    N094
     4        '............',E12.5 /                      N095
     5  '0 (SBX 1/E) * (A/T) ** 2 ..................',    N096
     6        '............',E12.5 /                      N097
     7  '0 (SMX 1/E) * (A/T) ** 2 ..................',    N098
     8        '............',E12.5 /                      N099
     9  '0 (SMY 4/E) * (A/T) ** 2 ..................',    N100
     A        '............',E12.5 /                      N101
     B  '0 (BXY 3/E) * (A/T) ** 2 ..................',    N102
     C        '............',E12.5 )                      N103
      END                                                N104
```

```
      SUBROUTINE PRINST (FXX,FXY,FYY,SBX,SBY,SBXY,IB)                   P001
      IMPLICIT REAL * 8 (A-H,O-Z)                                       P002
      COMMON /B1/ NUM                                                   P003
      DIMENSION FXX(1),FXY(1),FYY(1),SBX(1),SBY(1)                      P004
     1         ,SBXY(1),IB(1)                                           P005
C                                                                       P006
C                                                                       P007
CCCCCC     FIGUREOUT THE TOTAL STRESSES AT THE BOTTOM                   P008
C          OF THE PLATE, THE PRINCIPAL STRESSES AND                     P009
C          THEIR CORRESPONDING PRINCIPAL DIRECTIONS.                    P010
C                                                                       P011
      LC = 0                                                            P012
      WRITE (6,900)                                                     P013
      DO 50 I = 1 , NUM                                                 P014
          BSX = SBX(I) + FYY(I)                                         P015
          BSY = SBY(I) + FXX(I)                                         P016
          BSXY= SBXY(I)- FXY(I)                                         P017
          CEN = .5*(BSX+BSY)                                            P018
          RAD = DSQRT((0.5*(BSX-BSY))**2 + BSXY*BSXY)                   P019
          BS1= CEN + RAD                                                P020
          BS2 = CEN - RAD                                               P021
          BS = BS1 - BSY                                                P022
          IF (DABS(BS1-BSX) .LT. 0.00001) GO TO 20                      P023
          IF (DABS(BS) .LT. 0.000001) GO TO 10                          P024
          X1= DATAN(BSXY/BS) * 180. / 3.141592                          P025
          GO TO 30                                                      P026
   10     X1 = 90.0                                                     P027
          IF ((SBXY(I+1)-FXY(I+1)) .LT. 0.0) X1 = -90.                  P028
          GO TO 30                                                      P029
   20     X1 = .0                                                       P030
   30     X2 = X1 + 90.                                                 P031
          IF (LC .NE. 53) GO TO 40                                      P032
          LC = 0                                                        P033
          WRITE (6,910)                                                 P034
          WRITE (6,900)                                                 P035
   40     LC = LC + 1                                                   P036
          WRITE (6,920) I,IB(I),BSX,BSY,BSXY                            P037
     1                 ,BS1,BS2,X1,X2                                   P038
   50 CONTINUE                                                          P039
      RETURN                                                            P040
C                                                                       P041
  900 FORMAT (1H1,1X,'(NOTE:  *-BOUNDARY POINTS, *',                    P042
     1  '*-CORNER POINT)'///' NODE',10X,'TOTAL ',                       P043
     2  'STRESSES',14X,'SHEARING',15X,'PRINCIPAL ',                     P044
     3  'STRESSES',13X,'CORRESPONDING ANGLES' / 10X,                    P045
     4  'X-DIRECTION      Y-DIRECTION        ',                         P046
     5  'STRESS             ',                                          P047
     6  'MAXIMUM          MINIMUM          ',                          P048
     7  'MAXIMUM          MINIMUM' /)                                   P049
  910 FORMAT (1H0,30X,'(CONTINUED)')                                    P050
  920 FORMAT (I5,A4,3(E13.6,3X),4(3X,E13.6))                            P051
      END                                                               P052
```