```
      SUBROUTINE CONST                                    C001
      IMPLICIT REAL * 8 (A-H,O-Z)                         C002
      COMMON /B0/ AL,BL,HX2,HY2,HXY,HX,HY,HXT2,HYT2       C003
      COMMON /B1/ NUM,NX4,NX3,NX2,NX1,NY3,NY2,NY1,NX,NY   C004
      COMMON /B2/ RF,V,VS,D,PR,PR2,A1,A2,A4,PRA2,PRDA2    C005
      COMMON /B3/ TH,RC,SOVERD,TOVERD,EHX4,Q(8),ELAS      C006
     1            ,LINC,LORNL                             C007
      COMMON /B4/ T2,SN,CN,STIF,IDIS,IPRI,IREF,NBC        C008
     1            ,ITITLE(12)                             C009
      COMMON /B5/ C1,C2,C3,C4,C5,C6,C7,C8,C9              C010
C                                                         C011
C                                                         C012
CCCCCC        DATA INPUT                                  C013
C                                                         C014
C                                                         C015
      READ (5,50) AL,BL,TH,PR,ELAS,STIF,IDIS,IREF         C016
      IF (AL .EQ. 0.0) STOP                               C017
      READ (5,150) NBC,NX,NY,LINC,IPRI,LORNL,ITITLE,Q     C018
      IF (IPRI .EQ. 0) IPRI = LINC + 1                    C019
      IF (IDIS .EQ. 0) IDIS = LINC + 1                    C020
C                                                         C021
C                                                         C022
CCCCCC        SUPPLY MOST OF THE CONSTANTS COMMONLY USED  C023
C                                                         C024
C                                                         C025
      RC = 0.0                                            C026
      PR2 = PR * PR                                       C027
      D = ELAS * TH**3 / (12.*(1.-PR2))                   C028
      NX1 = NX + 1                                        C029
      NY1 = NY + 1                                        C030
      NX2 = NX + 2                                        C031
      NY2 = NY + 2                                        C032
      NX3 = NX + 3                                        C033
      NY3 = NY + 3                                        C034
      NX4 = 2*NX1 + 1                                     C035
      NUM = NX1 * NY1                                     C036
      HX = AL / NX                                        C037
      HY = BL / NY                                        C038
      HX2 =  HX * HX                                      C039
      HY2 = HY * HY                                       C040
      HXY =4. * HX * HY                                   C041
      HXT2 = 0.125 / HX2                                  C042
      HYT2 = 0.125 / HY2                                  C043
      A1 = HX / HY                                        C044
      A2 = A1 * A1                                        C045
      A4 = A2 * A2                                        C046
      PRA2 = PR * A2                                      C047
      PRDA2 = PR / A2                                     C048
      TOVERD = TH * HX2 * HX2 / D                         C049
      EHX4 = ELAS * HX2 * HX2                             C050
      T2 = TH * TH / 6.                                   C051
      SN = (2.0*AL/TH)**2 / ELAS                          C052
```

```
        CN = (2.0*AL/TH)**4 / ELAS                           C053
        RF = A2 * (1.-PR)                                     C054
        V = HX**3 * STIF / D                                  C055
        IF (NBC .GT. 2) VS = 0.5 * HX**3 * 1.0E20 / D         C056
        HX = HX / 3.                                          C057
        HY = HY / 3.                                          C058
        GO TO 10                                              C059
C                                                             C060
C                                                             C061
C                                                             C062
        ENTRY CONSTA                                          C063
C                                                             C064
C                                                             C065
CCCCCC      CONSTANTS BE USED BY SUBROUTINE MESH.             C066
C                                                             C067
C                                                             C068
        C1 = 6. + 8.*A2 + 6.*A4                               C069
        C2 = -4. - 4.*A2                                      C070
        C3 = 2. * A2                                          C071
        C4 = C2 * A2                                          C072
        GO TO 10                                              C073
C                                                             C074
C                                                             C075
C                                                             C076
        ENTRY CONSTB                                          C077
C                                                             C078
C                                                             C079
CCCCCC      CONSTANTS BE USED BY SUBROUTINE MESHW.            C080
C                                                             C081
C                                                             C082
        C1 =1.+ 4.*A2 + 3.*A4 - 4.*A2*PR - 3.*A4*PR2 + V      C083
        C2 = -2. - 4.*A2 + 2.*A2*PR                           C084
        C3 = A2*(2.-PR)                                       C085
        C4 = -2.*(A2 + A4 - A2*PR - A4*PR2)                   C086
        C5 = 0.5*A4*(1.-PR2)                                  C087
        C6 = -4.*A2 - 2.*A4 + 2.*A2*PR                        C088
        C7 = 3. + 4.*A2 + A4 - 4.*A2*PR - 3.*PR2 + V*A1       C089
        C8 = -2.*(1. + A2 - A2*PR - PR2)                      C090
        C9 = 0.5*(1.-PR2)                                     C091
C                                                             C092
C                                                             C093
     10 RETURN                                                C094
C                                                             C095
C                                                             C096
     50 FORMAT (6E10.4,2I5)                                   C097
    150 FORMAT (6I5,12A4/8E10.4)                              C098
        END                                                   C099
```

```
      SUBROUTINE SOLVE (FAC,A,B,W,F,WXX,WXY,WYY              D001
     1                  ,FXX,FXY,FYY,WO,FO,V,IB)             D002
      IMPLICIT REAL * 8 (A-H,O-Z)                            D003
      COMMON /B1/ NUM                                        D004
      DIMENSION FAC(1),A(NUM,1),B(NUM,1),W(1),WO(1)          D005
     1            ,F(1),FO(1),WXX(1),WXY(1),WYY(1)           D006
     2            ,FXX(1),FXY(1),FYY(1),V(1),IB(1)           D007
C                                                            D008
C                                                            D009
C                                                            D010
      CALL MESH   (A,FAC)                                    D011
      CALL MESHF  (A,FAC,B,IB)                               D012
      CALL MESHW  (A,FAC)                                    D013
      CALL EQSOLV (A)                                        D014
      CALL EQSOLV (B)                                        D015
      CALL WANDF  (FAC,A,B,W,WO,F,FO,WXX,WXY,WYY,FXX         D016
     1            ,FXY,FYY,V,IB)                             D017
C                                                            D018
C                                                            D019
C                                                            D020
      RETURN                                                 D021
      END                                                    D022
```

```
      SUBROUTINE MESH (A,FAC)                               E001
      IMPLICIT REAL * 8 (A-H,O-Z)                           E002
      COMMON /B1/ NUM,NX4,NX3,NX2,NX1,NY3,NY2,NY1,NX,NYE003
      COMMON /B2/ RF,V,VS,D,PR,PR2,A1,A2,A4                 E004
      COMMON /B5/ C1,C2,C3,C4                               E005
      DIMENSION A(NUM,1),FAC(1)                             E006
C                                                           E007
C                                                           E008
C                                                           E009
CCCCCC      SUBROUTINE CONSTA IS REFERRED TO AS AN          E010
C           ENTRY POINT WITHIN SUBROUTINE CONST.            E011
C                                                           E012
C                                                           E013
      CALL CONSTA                                           E014
C                                                           E015
C                                                           E016
CCCCCC      BASIC MATRIX A FORMED, NOT INCLUDING            E017
C           BOUNDARY CONDITIONS.  MATRIX A IS A             E018
C           HALF-BANDED, SYMMETRICAL MATRIX.                E019
C                                                           E020
C                                                           E021
      DO 20 K = 1 , NY                                      E022
          IX = (K-1) * NX1                                  E023
          DO 10 J = 1 , NX                                  E024
              I = IX + J                                    E025
              A(I,1) = C1                                   E026
              A(I,2) = C2                                   E027
              A(I,3) = 1.0                                  E028
              A(I,NX1) = C3                                 E029
              A(I,NX2) = C4                                 E030
              A(I,NX3) = C3                                 E031
              A(I,NX4) = A4                                 E032
   10     CONTINUE                                          E033
   20 CONTINUE                                              E034
C                                                           E035
C                                                           E036
      K = NUM - NX2                                         E037
      J = K - NX + 1                                        E038
      DO 30 I = J , K                                       E039
          A(I,NX1) = 0.0                                    E040
          A(I,NX2) = 0.0                                    E041
          A(I,NX3) = 0.0                                    E042
          A(I,NX4) = 0.0                                    E043
          A(I,1) = A(I,1) - A4                              E044
   30 CONTINUE                                              E045
      IX = NX4 - 2                                          E046
      DO 40 I = NX2 , IX                                    E047
          A(I,1) = A(I,1) + A4                              E048
   40 CONTINUE                                              E049
C                                                           E050
C                                                           E051
C                                                           E052
```

```
      DO 50 I = 1 , K , NX1                    E053
          IX = I + NX -1                       E054
          A(I,NX1) = 0.0                       E055
          A(IX-1 , 3) = 0.0                    E056
          A(IX,2) = 0.0                        E057
          A(IX,3) = 0.0                        E058
          A(IX,NX3) = 0.0                      E059
          A(IX,1) = A(IX,1) - 1.0              E060
          A(I+1 , 1) = A(I+1 , 1) + 1.0        E061
          A(I,1) = A(I,1) * 0.5                E062
          A(I,NX2) = A(I,NX2) * 0.5            E063
          A(I,NX4) = A(I,NX4) * 0.5            E064
          FAC(I) = FAC(I) * 2.0                E065
   50 CONTINUE                                 E066
      DO 60 I = 1 , NX                         E067
          A(I, 1) = A(I,1) * 0.5               E068
          A(I,2) = A(I,2) * 0.5                E069
          A(I,3) = A(I,3) * 0.5                E070
          FAC(I) = FAC(I) * 2.0                E071
   60 CONTINUE                                 E072
      RETURN                                   E073
      END                                      E074
```

```
      SUBROUTINE MESHF (A,FAC,B,IB)                          F001
      IMPLICIT REAL * 8 (A-H,O-Z)                            F002
      COMMON /B1/ NUM,NX4,NX3,NX2,NX1,NY3,NY2,NY1,NX         F003
      COMMON /B2/ RF,V,VS,D,PR,PR2,A1,A2,A4                  F004
      DIMENSION A(NUM,1),B(NUM,1),FAC(1),IB(1),IBS(3)        F005
      DATA IBS /'    ',' * ',' ** '/                         F006
C                                                            F007
C                                                            F008
CCCCCC        COPY MATRIX B(STRESS FUNCTION) FROM            F009
C             MATRIX A.  MATRIX B, ALSO, IS A HALF-          F010
C             BANDED, SYMMETRICAL MATRIX.                    F011
C                                                            F012
C                                                            F013
      DO 80 I = 1 , NUM                                      F014
         DO 70 J = 1 , NX4                                   F015
            B(I,J) = A(I,J)                                  F016
   70    CONTINUE                                            F017
      IB(I) = IBS(1)                                         F018
   80 CONTINUE                                               F019
      K = NUM - NX2                                          F020
      DO 90 I = NX , K ,NX1                                  F021
         B(I,1) = B(I,1) + 2. / FAC(I)                       F022
   90 CONTINUE                                               F023
      J = NUM - 2*NX1 + 1                                    F024
      DO 100 I = J , K                                       F025
         B(I,1) = B(I,1) + 2. / FAC(I) * A4                  F026
         B(I-NX1,NX4) = 0.0                                  F027
  100 CONTINUE                                               F028
C                                                            F029
C                                                            F030
CCCCCC        SET THE BOUNDARY INDICATORS.                   F031
C                                                            F032
C                                                            F033
      K = NUM - 1                                            F034
      DO 110  I = NX1 , K , NX1                              F035
         IB(I) = IBS(2)                                      F036
  110 CONTINUE                                               F037
      J = NUM - NX                                           F038
      DO 120  I = J , K                                      F039
         IB(I) = IBS(2)                                      F040
  120 CONTINUE                                               F041
      IB(NUM) = IBS(3)                                       F042
C                                                            F043
C                                                            F044
C                                                            F045
      RETURN                                                 F046
      END                                                    F047
```