```
      SUBROUTINE MESHW (A,FAC)                                          G001
      IMPLICIT REAL * 8 (A-H,O-Z)                                       G002
      COMMON /B1/ NUM,NX4,NX3,NX2,NX1,NY3,NY2,NY1                       G003
      COMMON /B2/ RF,V,VS,D,PR,PR2,A1,A2,A4                             G004
      COMMON /B5/ C1,C2,C3,C4,C5,C6,C7,C8,C9                            G005
      DIMENSION A(NUM,1),FAC(1)                                         G006
C                                                                       G007
C                                                                       G008
CCCCCC     SUBROUTINE CONSTB IS REFERRED TO AS AN                       G009
C          ENTRY POINT WITHIN SUBROUTINE CONST.                         G010
C                                                                       G011
C                                                                       G012
      CALL CONSTB                                                       G013
C                                                                       G014
C                                                                       G015
CCCCCC     MATRIX A(DEFLECTION) REFORMED INCLUDING                      G016
C          BOUNDARY CONDITIONS.                                         G017
C                                                                       G018
C                                                                       G019
      K = NUM - NX1                                                     G020
      DO 10 I = NX1 , K , NX1                                           G021
          FAC(I) = 2.                                                   G022
          A(I,1) = C1                                                   G023
          A(I,NX1) = C3                                                 G024
          A(I,NX2) = C4                                                 G025
          A(I,NX4) = C5                                                 G026
          A(I-1,2) = C2                                                 G027
          A(I-1,NX3) = C3                                               G028
          A(I-2,3) = 1.                                                 G029
   10 CONTINUE                                                          G030
      FAC(NX1) = 4.                                                     G031
      A(NX1,1) = 0.5*C1                                                 G032
      A(NX1-1,2) = 0.5*C2                                               G033
      A(NX1-2,3) = 0.5                                                  G034
      A(NX4-1,1) = C1 + 0.5*A4*(1.-PR2)                                 G035
      A(K,1) = C1 - 0.5*A4*(1.-PR2)                                     G036
      A(K,NX2) = C4 + A4*(1.-PR2)                                       G037
      A(K,NX4) = 0.0                                                    G038
      J = NUM - 2*NX1 + 1                                               G039
      K = NUM - NX2                                                     G040
      DO 20 I = J , K                                                   G041
          A(I,NX1) = C3                                                 G042
          A(I,NX2) = C6                                                 G043
          A(I,NX3) = C3                                                 G044
   20 CONTINUE                                                          G045
      A(J,NX1) = 0.0                                                    G046
      A(J,NX2) =  0.5 * C6                                              G047
      A(K,NX3) = 2. * C3                                                G048
      J = NUM - NX1 + 1                                                 G049
      K = NUM - 2                                                       G050
C                                                                       G051
C                                                                       G052
```

```
      DO 30 I = J , K                                                    G053
          A(I, 1) = C7                                                   G054
          A(I, 2) = C8                                                   G055
          A(I, 3) = C9                                                   G056
          FAC(I) = 2.                                                    G057
   30 CONTINUE                                                           G058
      A(J, 1) = 0.5 * C7                                                 G059
      A(J+1, 1) = A(J+1, 1) + 0.5*(1.-PR2)                               G060
      A(K+1, 1) = A(J+1, 1) - 1. + PR2                                   G061
      A(K+1, 2) = C8 + 1. -PR2                                           G062
      A(NUM, 1) = A(J, 1) + 0.5*V - 1.+ PR2 - 0.5*A4*PR2                 G063
      FAC(J) = 4.                                                        G064
      FAC(K+1) = 2.                                                      G065
      FAC(NUM) = 4.                                                      G066
      IF (V .EQ. 0.0) A(NUM, 1) = A(NUM, 1) + (1.+A1)*VS                 G067
      RETURN                                                             G068
      END                                                                G069
```

```
      SUBROUTINE WANDF (FAC,A,B,W,WO,F,FO,WXX,WXY,WYY                  H001
     1                 ,FXX,FXY,FYY,V,IB)                              H002
      IMPLICIT REAL * 8 (A-H,O-Z)                                      H003
      COMMON /B1/ NUM,NX4,NX3,NX2,NX1                                  H004
      COMMON /B3/ TH,RC,SOVERD,TOVERD,EHX4,Q(8),ELAS                   H005
     1           ,LINC,LORNL                                           H006
      COMMON /B4/ T2,SN,CN,STIF,IDIS,IPRI,IREF                         H007
      DIMENSION FAC(1),A(NUM,1),B(NUM,1),W(1),WO(1)                    H008
     1          ,F(1),FO(1),WXX(1),WXY(1),WYY(1)                       H009
     2          ,FXX(1),FXY(1),FYY(1),V(1),IB(1)                       H010
C                                                                      H011
C                                                                      H012
      DO 100 NT = 1 , LINC                                             H013
         IF (NT .LE. 8) QT = Q(NT) / TH                                H014
         IF (Q(2) .EQ. 0.0) QT = NT * Q(1) / TH                        H015
         IF (LORNL .EQ. 2) NB1 = 1                                     H016
C                                                                      H017
C                                                                      H018
CCCCCC    SUBROUTINES SOR, CHECKF, DERF AND REF ARE                    H019
C         REFERRED TO AS ENTRY POINTS WHININ SUB-                      H020
C         ROUTINES EQSOLV, CHECKW, DERW2 AND TITLE,                    H021
C         RESPECTIVELY.                                                H022
C                                                                      H023
C                                                                      H024
CCCCCC    SOLVE BIHARMONIC EQUATION OF DEFLECTION                      H025
C                                                                      H026
C                                                                      H027
         DO 80 KK = 1 , 30                                             H028
            DO 10 I = 1 , NUM                                          H029
               WO(I) = W(I)                                            H030
               W(I) = (QT - 2.*WXY(I)*FXY(I) +                         H031
     1                    FXX(I)*WYY(I)+WXX(I)*FYY(I))                 H032
     2                * TOVERD / FAC(I)                               H033
   10        CONTINUE                                                  H034
            W(NUM) = W(NUM) - RC                                       H035
            CALL SOL (A,W)                                             H036
            IF (NB1 .EQ. 1) CALL CHECKW (W,WO,NB1)                     H037
            CALL DERW2 (W,WXX,WXY,WYY,V,2)                             H038
            IF (LORNL .EQ. 2) GO TO 30                                 H039
            IF (DABS(W(NUM)-WO(NUM)) .LT.                              H040
     1          DABS(0.01*W(NUM))) GO TO 90                            H041
            GO TO 80                                                   H042
C                                                                      H043
C                                                                      H044
CCCCCC    SOLVE BIHARMONIC EQUATION OF STRESS FUNCTION                 H045
C                                                                      H046
C                                                                      H047
   30        DO 50 I = 1 , NUM                                         H048
               FO(I) = F(I)                                            H049
               F(I) = EHX4 * (WXY(I)*WXY(I)                            H050
     1                - WXX(I)*WYY(I)) / FAC(I)                       H051
   50        CONTINUE                                                  H052
```

```
                CALL SOL(B,F)                                          H053
                IF (NB1 .EQ. 1) CALL CHECKF (F,FO)                     H054
                CALL DERF (F,FXX,FXY,FYY,V)                            H055
C                                                                      H056
C                                                                      H057
CCCCCC      CHECK CONVERGENCE OF SOLUTIONS.                            H058
C                                                                      H059
C                                                                      H060
            IF (NB1 .EQ. 0) GO TO 90                                   H061
   80       CONTINUE                                                   H062
C                                                                      H063
C                                                                      H064
CCCCCC      ALL OUTPUT PRINT WILL BE EXECUTED BY                       H065
C           THE FOLLOWING CALL STATEMENTS.                             H066
C                                                                      H067
C                                                                      H068
   90 CALL TITLE (WXY(NUM),QT,NT,KK)                                   H069
C                                                                      H070
      IF (IREF .EQ. 0) GO TO 95                                        H071
      CALL REF (QT,W(1),WXX(1),WYY(1),FYY(1),FXX(NX1))                 H072
C                                                                      H073
   95 CALL STRESS(W,WXX,WXY,WYY,FXX,FXY,FYY,WO,FO,V,IB)                H074
C                                                                      H075
      IF (NT/IPRI*IPRI .EQ. NT) CALL PRINST                            H076
     1                (FXX,FXY,FYY,WO,FO,V,IB)                        H077
C                                                                      H078
      IF (NT/IDIS*IDIS .EQ. NT) CALL DISPL                             H079
     1                (W,FXX,FYY,WO,FO,V,IB)                          H080
C                                                                      H081
  100 CONTINUE                                                         H082
C                                                                      H083
      RETURN                                                           H084
      END                                                              H085
```

```
      SUBROUTINE EQSOLV (S)                                          I001
      IMPLICIT REAL * 8 ( A-H, O-Z )                                 I002
      COMMON /B1/ NUM,NX4                                            I003
      DIMENSION S(NUM,1),R(1)                                        I004
C                                                                    I005
CCCCCC     FORWARD ELIMINATION (GAUSS METHOD)                        I006
C                                                                    I007
      DO 790  N = 1 , NUM                                            I008
          IF (S(N,1) .EQ. 0.0) GO TO 790                             I009
          DO 780   L = 2 , NX4                                       I010
              IF (S(N,L) .EQ. 0.0) GO TO 780                         I011
              C = S(N,L) / S(N,1)                                    I012
              I = N + L - 1                                          I013
              J = 0                                                  I014
              DO 750  K = L , NX4                                    I015
                  J = J + 1                                          I016
                  S(I,J) = S(I,J) - C * S(N,K)                       I017
  750         CONTINUE                                               I018
              S(N,L) = C                                             I019
  780     CONTINUE                                                   I020
  790 CONTINUE                                                       I021
      GO TO 1010                                                     I022
C                                                                    I023
CCCCCC     FORWARD REDUCTION OF CONSTANTS                            I024
C                                                                    I025
      ENTRY SOL (S,R)                                                I026
C                                                                    I027
      DO 830  N = 1 , NUM                                            I028
          IF (S(N,1) .EQ. 0.0) GO TO 830                             I029
          DO 820  L = 2 , NX4                                        I030
              IF (S(N,L) .EQ. 0.0) GO TO 820                         I031
              I = N + L - 1                                          I032
              R(I) = R(I) - S(N,L) * R(N)                            I033
  820     CONTINUE                                                   I034
          R(N) = R(N) / S(N,1)                                       I035
  830 CONTINUE                                                       I036
C                                                                    I037
CCCCCC     SOLVE FOR UNKNOWNS BY BACK SUBSTITUTIONS                  I038
C                                                                    I039
      DO 860  N = 1 , NUM                                            I040
          N = NUM + 1 - N                                            I041
          IF (S(N,1) .EQ. 0.0) GO TO 850                             I042
          DO 840  L = 2 , NX4                                        I043
              IF (S(N,L) .EQ. 0.0) GO TO 840                         I044
              K = N + L - 1                                          I045
              R(N) = R(N) - S(N,L) * R(K)                            I046
  840     CONTINUE                                                   I047
          GO TO 860                                                  I048
  850     R(N) = 0.0                                                 I049
  860 CONTINUE                                                       I050
 1010 RETURN                                                         I051
      END                                                            I052
```

```
      SUBROUTINE CHECKW (WF,WFO,NB)                                    J001
      IMPLICIT REAL * 8 (A-H,O-Z)                                      J002
      COMMON /B1/ NUM,NX4,NX3,NX2,NX1                                  J003
      COMMON /B3/ TH                                                   J004
      DIMENSION WF(1),WFO(1)                                           J005
C                                                                      J006
C                                                                      J007
CCCCCC     CHECK CONVERGENCE OF DEFLECTION                             J008
C                                                                      J009
C                                                                      J010
      ERROR = 0.0                                                      J011
      DO 10 I = 1 , NUM                                                J012
         ERROR = ERROR + (WF(I)-WFO(I)) ** 2                           J013
   10 CONTINUE                                                         J014
      ERROR = DSQRT(ERROR/NUM)                                         J015
      IF (ERROR .LT. DABS(0.005*WF(1))) GO TO 70                       J016
C                                                                      J017
C                                                                      J018
CCCCCC     DETERMINE NEW VALUES OF DEFLECTION                          J019
C                                                                      J020
C                                                                      J021
      WNON = WF(1) / TH                                                J022
      IF (WNON .LT. 1.8) GO TO 20                                      J023
      AA2 = 0.6 / (WNON - 1.0) + 0.05                                  J024
      GO TO 30                                                         J025
   20 AA2 = .8                                                         J026
   30 AA1 = 1. - AA2                                                   J027
      DO 40 I = 1,NUM                                                  J028
         WF(I) = AA1*WFO(I) + AA2*WF(I)                                J029
   40 CONTINUE                                                         J030
      GO TO 80                                                         J031
C                                                                      J032
C                                                                      J033
      ENTRY CHECKF (WF,WFO)                                            J034
C                                                                      J035
C                                                                      J036
CCCCCC     DETERMINE NEW VALUES OF STRESS FUNCTION                     J037
C                                                                      J038
C                                                                      J039
   50 DO 60 I = 1 , NUM                                                J040
         WF(I) = 0.5 * (WF(I) + WFO(I))                                J041
   60 CONTINUE                                                         J042
      GO TO 80                                                         J043
C                                                                      J044
C                                                                      J045
CCCCCC     CONVERGENCE INDICATOR NB = 0                                J046
C                                                                      J047
C                                                                      J048
   70 NB = 0                                                           J049
C                                                                      J050
   80 RETURN                                                           J051
      END                                                              J052
```

```
      SUBROUTINE DERW2 (C,CXX,CXY,CYY,V,NC)                          K001
      IMPLICIT REAL * 8 ( A-H, O-Z )                                 K002
      COMMON /B1/ NUM,NX4,NX3,NX2,NX1,NY3,NY2,NY1                    K003
      COMMON /B2/ RF,DV,VS,D,PR,PR2,A1,A2,A4,PRA2,PRDA2              K004
      COMMON /B3/ TH,RC                                              K005
      DIMENSION C(1),CXX(1),CXY(1),CYY(1),V(NY3,1)                   K006
C                                                                    K007
C                                                                    K008
      ENTRY DERW1 (C,CXX,CYY,V,NC)                                   K009
C                                                                    K010
C                                                                    K011
      CALL ZERO (C,V)                                                K012
      DO 180 I = 2 , NY1                                             K013
         V(I,NX3) = 2.*(1.+PRA2)*V(I,NX2) - V(I,NX1)                 K014
     1            - PRA2*(V(I+1,NX2) + V(I-1,NX2))                  K015
  180 CONTINUE                                                       K016
      V(NY2,NX3) = 2.*V(NY2,NX2) - V(NY2,NX1)                        K017
      V(1,NX3) = V(3,NX3)                                            K018
      DO 190 J = 2 , NX1                                             K019
         V(NY3,J) = 2.*(1.+PRDA2)*V(NY2,J) - V(NY1,J)                K020
     1            - PRDA2*(V(NY2,J-1) + V(NY2,J+1))                 K021
  190 CONTINUE                                                       K022
      V(NY3,NX2) = 2.*V(NY2,NX2) - V(NY1,NX2)                        K023
      V(NY3,1) = V(NY3,3)                                            K024
      RC = RF * (V(NY1,NX3)-2.*V(NY2,NX2)+V(NY3,NX1))                K025
      V(NY3,NX3) = 4.*V(NY2,NX2) - (V(NY1,NX1)                       K026
     1           + V(NY1,NX3) + V(NY3,NX1))                        K027
C                                                                    K028
C                                                                    K029
      IF (NC .EQ. 1) CALL FIRST  (CXX,CYY,V)                         K030
      IF (NC .EQ. 2) CALL SECOND (CXX,CXY,CYY,V)                     K031
      GO TO 200                                                      K032
C                                                                    K033
C                                                                    K034
      ENTRY DERF (C,CXX,CXY,CYY,V)                                   K035
C                                                                    K036
C                                                                    K037
      CALL ZERO (C,V)                                                K038
      DO 210 I = 1 , NY2                                             K039
         V(I,NX3) = V(I,NX1)                                         K040
  210 CONTINUE                                                       K041
      DO 220 J = 1 , NX3                                             K042
         V(NY3,J) = V(NY1,J)                                         K043
  220 CONTINUE                                                       K044
C                                                                    K045
C                                                                    K046
      CALL SECOND (CXX,CXY,CYY,V)                                    K047
C                                                                    K048
C                                                                    K049
  200 RETURN                                                         K050
      END                                                            K051
```