

APPENDIX C  
COMPUTER PROGRAMME

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// JOB XXX
// OPTION LINK
// EXEC FFORTRAN
// FIC RCD
C
C   COMPUTER PROGRAMME ORG COMPUTER R 1030 BARODA
C
C   VAISHNAV S. V.
C
C   PH. D. THESIS
C   M. S. UNIVERSITY OF BARODA, BARODA
C
C   BIAXIAL BENDING REIN. CONCRETE
C   RECTANGULAR SECTIONS
C
C   CASE 1, NEUTRAL AXIS INTERSECTING
C   OPPOSITE SIDES
C
C   DIMENSION F(6),PM(9),Z(5),AK2(4),AN(6),DY(8),DX(8),IH1(4),R(5)
C   DIMENSION AA(4),H(2)
C   ICT=0
C   ICT1=0
C   PRINT 1112
C   WRITE 8,1112
C   READ 2, IF,IPM,IZ,IK2,IAN,IDY,IDX, IR
C   READ 3,(F(I),I=1,IF),(PM(I),I=1,IPM),(Z(I),I=1,IZ),(AK2(I),I=1,IK2
1), (AN(I),I=1,IAN),(DY(I),I=1,IDY),(DX(I),I=1,IDX),(R(I),I=1,IR)
C   READ 9,(IH1(I),I=1,3)
C   DO 10 ISSI=1,IF
C   ZW1=F(ISSI)
C   DO 10 K=1,IZ
C   ZW3=Z(K)
C   DO 10 L=1,IK2
C   ZW4=AK2(L)
C   DO 10 M=1,IAN
C   ZW5=AN(M)
C   DO 10 N=1,IDY
C   ZW6=DY(N)
C   DO 10 IA=1,IDX
C   ZW7=DX(IA)
C   CALL PMCR(ZW1,ZW3,ZW4,ZW5,ZW6,ZW7,PMCR0,PMCR1,PMCR2,PMCR3)
C   DO 10 J=1,IPM
C   ZW2=PM(J)
C   DO 10 KA=1,IR
C   ZW8=R(KA)
C   IF(ZW2-PMCR0)110,120,130
110 CONTINUE
C   IF(ZW2-PMCR1)140,120,120
140 CONTINUE
C   CALL ABCD1I(ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,AA)
C   CALL QURCSN(AA,H)
C   ITAG=IH1(1)

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      DO 20 I=1,3
      IF(H(I))20,20,30
30    CALL DH1I(ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,H(I),PU,AMU)
      CALL ALPHA(ZW1,H(I),AL)
      PRINT 7,ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,H(I),PU,AMU,AL,PMCR0,PMCRA
1,ITAG
      WRITE 8,7 ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,H(I),PU,AMU,AL,PMCR0,
1PMCRA,ITAG
      ICT=ICT+1
      IF(ICT-7)20,20,21
21    PRINT 1111
      WRITE 8,1111
      ICT=0
      ICT1=ICT+9
      IF(ICT1-62)20,20,22
22    PRINT 1112
      WRITE 8,1112
      ICT1=0
20    CONTINUE
      GO TO 11
120   CONTINUE
      CALL ABCD3I(ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,AA)
      CALL QURCSO(AA,H)
      ITAG=IH1(3)
      DO 50 I=1,3
      IF(H(I))50,50,44
44    CALL DH3I(ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,H(I),PU,AMU)
      CALL ALPHA(ZW1,H(I),AL)
      PRINT 7,ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,H(I),PU,AMU,AL,PMCR0,PMCRA
1,ITAG
      WRITE 8,7 ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,H(I),PU,AMU,AL,PMCR0,
1PMCRA,ITAG
      ICT=ICT+1
      IF(ICT-7)50,50,51
51    PRINT 1111
      WRITE 8,1111
      ICT=0
      ICT1=ICT+9
      IF(ICT1-62)50,50,52
52    PRINT 1112
      WRITE 8,1112
      ICT1=0
50    CONTINUE
      GO TO 11
120   CONTINUE
      CALL ABCD2I(ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,AA)
      CALL QURCSO(AA,H)
      ITAG=IH1(2)
      DO 40 I=1,3

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      IF(H(I))40,40,45
45   CALL DH2I(ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,H(I),P(I),AM(I))
      CALL ALPHA(ZW1,H(I),AL)
      PRINT 7,ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,H(I),P(I),AM(I),AL,PMCR(I),PMCR(A
1,I)TAG
      WRITE 8,7 ZW1,ZW2,ZW3,ZW4,ZW5,ZW6,ZW7,ZW8,H(I),P(I),AM(I),AL,PMCR(I),
1PMCR(A,I)TAG
      ICT=ICT+1
      IF(ICT-7)40,40,41
41   PRINT 1111
      WRITE 8,1111
      ICT=0
      ICT1=ICT1+9
      IF(ICT1-62)40,40,42
42   PRINT 1112
      WRITE 8,1112
      ICT1=0
40   CONTINUE
11   CONTINUE
10   CONTINUE
7   FORMAT(8X,F4.1,F4.2,F5.2,F4.2,F5.2,3F4.1,3F8.4,F8.4,2F6.3,1X,A2)
9   FORMAT(3A2)
2   FORMAT(9I2)
3   FORMAT(20F4.2)
1111 FORMAT 1H
1112 FORMAT 1H1
      STOP
      END

C
C   MP CRITICAL OPPOSITE
      SUBROUTINE PMCR(ZW1,ZW3,ZW4,ZW5,ZW6,ZW7,PMCR(I),PMCR(A(I))
      FF=2./(2.+ZW5*(1.+ZW1))
      FFF=(-15.-90.*ZW1-40.*ZW1**2+20.*ZW1**3-3.*ZW1**4)
      F1=-(FF*FF*FFF/60.)
      HH=(2.+3.*ZW1+ZW1**2)/3.
      F2=HH*ZW7*2.*ZW1*FF**2
      F3=FF*ZW6*HH
      PP=(1.+ZW1)**2
      PPP=ZW1-ZW3*ZW1*ZW4+(1.-ZW3)*ZW7*2.*ZW1
      PPR=1.-ZW3*ZW4+ZW6-ZW3*ZW6
      F4=ZW5*FF*PP*PPP
      F5=ZW5*PP*PPR
      PMCR(I)=(F1+F2+F3)/(F4+F5)
C   MP BAR OPPOSITE
      RR=2.*ZW4/(2.+2.*ZW1-2.*ZW1*ZW4-ZW5-ZW1*ZW5)
      B1=-(RR*RR*FFF)/60.
      B2=RR*RR*HH*ZW7*2.*ZW1
      B3=RR*ZW6*HH
      B4=ZW5*RR*PP*PPP

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B5=ZW5*PP*PPR
PMRAN=(B1+B2+B3)/(R4+B5)
RETURN
END

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ALPHA U OPPOSITE
SUBROUTINE ALPHA(F,ROOT,AL)
AL=(2.*(1.+ROOT*F))/(ROOT*(1.+F))
RETURN
END

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ABCD-1 I OPP TENSION FAILURE
SUBROUTINE ABCD1(SVV1,SVV3,SV6,SV7,SVV4,SVV5,SVV2,SV8,AA)
DIMENSION AA(4)
A=(-15.-90.*SVV1-40.*SVV1*SVV1+20.*SVV1**3-3.*SVV1**4)/60.-2.*SVV1
1*SVV2*(2.+3.*SVV1+SVV1**2)/3.
B=-SVV3*SVV4*(1.+SVV1)**2-SVV5*(2.+3.*SVV1+SVV1*SVV1)/3.+SVV3*SVV4
1*(1.+SVV1)**3-4.*SVV3*SV6*(1.+SVV1)**2*SV7*SVV1-4.*SVV3*SV6*(1.+SV
2V1)**2*SVV2*SVV1+2.*SVV3*SV6*(1.+SVV1)**2*SV7*SVV1+2.*SVV3*SVV4*(1
3.+SVV1)**2*SVV2*SVV1+SVV3**2.*SV6*(1.+SVV1)*SV7**2*SVV1**2+2.*SVV3*
4SV6*(1.+SVV1)*SV7*SVV2**2.*SVV1**2
C=-4.*SVV3*SV6*(1.+SVV1)**2*SV7+SVV3*SVV4*(1.+SVV1)**2-2.*SVV3*SV6
1*(1.+SVV1)**2*SVV5+2.*SVV3*SV6*(1.+SVV1)**2*SV7+SVV3*SVV4*(1.+SVV1
2)**2*SVV5+4.*SVV3*SV6*(1.+SVV1)*SV7**2*SVV1+4.*SVV3*SV6*(1.+SVV1)*
3SV7*SVV2*SVV1+2.*SVV3*SV6*(1.+SVV1)*SV7*SVV5*SVV1
D=2.*SVV3*SV6*(1.+SVV1)*SV7**2+2.*SVV3*SV6*SVV5*SV7*(1.+SVV1)
AA(1)=A
AA(2)=B
AA(3)=C
AA(4)=D
RETURN
END

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PU-MU FOR ABCD-1, I OPP. TENSION.
60 SUBROUTINE DH1(F,PM,Z,AK2,AN,DY,DX,R,ROOT,PU,AMU)
DIMENSION H(3)
I=1
H(I)=ROOT
30 P1=PM*Z
P2=P1*AK2
P4=1.+F
P5=1.+F*H(I)
P6=1.+(F**2)*(H(I)**2)*R**4.
PMN=PM*AN
PU=(H(I)*(2.+3.*F+F**2)/(3.*P4**P4))+((2.*P1*P5)/(H(I)*P4)*((H(I)*P
14)/P5-AK2))-(PMN)
P7=2.*H(I)*H(I)*(1.+F**2)/(3.*SQRT(P6)*P4)
P8=H(I)*H(I)*(-5.-10.*F-F**4)
P9=20.*SQRT(P6)*P4**P4
P10=2.*P1*P5**2/(H(I)*P4*SQRT(P6))*(H(I)*P4/P5-AK2)**2
P11=PMN*(1.-H(I))/SQRT(P6)

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AMU=P7+P8/P9+P10+P11
RFTURN
END

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ABCD-2 I OPPOSITE COMP FAILURE
SUBROUTINE ABCD2I (PCC2,PCC4,PCC5,PCC8,PCC6,PCC7,PCC3,DM1,AA)
DIMENSION AA(4)
PC21=(-15.-90.*PCC2-40.*PCC2**2+20.*PCC2**3-3.*PCC2**4)/60.
PC22=(2.+3.*PCC2+PCC2*PCC2)*PCC3*2.*PCC2)/3.
A=PC21-PC22
PC23=(1.+PCC2)
PC24=PC23*PC23
PC25=PCC4*PCC5
PC26=PC25*PCC6
PC27=(2.+3.*PCC2+PCC2*PCC2)/3.
B=(PC26*PC24)-(PC27*PCC7)-(2.*PCC4*PC24)-(PC26*PC23*PC24)+(PC26*(1
1.-PCC8)*PC24*PCC2)-(4.*PCC4*PC23*PCC3*PCC2)-PCC3*2.*PCC2*PC24*PC2
16+(2.*PCC4*PC23)
C=(PC26*(-PCC8)*PC24)+(2.*PCC4*PC24)-(2.*PCC4*PCC7*PC23)-PCC7*PC2
14*PC26-(4.*PCC4*PC23)+ (4.*PCC4*PC23*PCC3*PCC2*PCC2)
D=(2.*PCC4*PC23*(1.+PCC7))
AA(1)=A
AA(2)=B
AA(3)=C
AA(4)=D
RETURN
END

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60 PU-MU FOR ABCD-2 I OPP. COMP.
SUBROUTINE DH2I(F,PM,Z,AK2,AN,DY,DX,R,ROOT,PU,AMU)
DIMENSION H(3)
I=1
H(I)=ROOT
PC2P=H(I)
PC2Q=(2.+3.*F+F*F)/(3.*(1.+F)*(1.+F))
PC2R=2.*PM*(1.-PC2P)
PC2S=PC2P*(1.+F)
PC2T=PM*Z*AN
PU21=(PC2P*PC2Q)-(PC2R)/(PC2S)+PC2T
PU=PU21
AMA=2.*PC2P*PC2P*(1.+F*F)
AMTC=SQRT(1.+4.*F*F*PC2P*PC2P*R*R)
AMTD=3.*(1.+F)
AMTE=(-5.-10.*F-F**4)
AMTF=20.*(1.+F)*(1.+F)
AMTG=(1.+PC2P*F)
AMTH=(PC2P*(1.+F))/(1.+F*PC2P)-AK2
AMTI=(1.-PC2P)*(1.-PC2P)
AMTJ=(1.+F)*PC2P
AMU21=(AMA)/(AMTD*AMTC)+(PC2P*PC2P*AMTE)/(AMTF*AMTC)+PC2T*AMTG*AMT

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1H/(AMTC)+(2.*PM*AMTI)/(AMTC*AMTJ)
AMU=AMU21
RFURN
END

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ABCD- 3 I OPPOSITE BALANCE
SUBROUTINE ABCD3I(F3A,PM31,Z31,AK3,AN31,DY31,DX31,DM2,AA)
DIMENSION AA(4)
B3A=(-15.-90.*F3A-40.*F3A*F3A+20.*F3A*F3A*F3A-3.*F3A**4)
B3B=B3A/60.
B3C=(2.+3.*F3A+F3A*F3A)/3.
B3D=B3C*DX31*2.*F3A
A=0
B=B3B-B3D
B3E=PM31*AN31*(1.+F3A)*(1.+F3A)*(1.-Z31*AK3)*F3A
B3F=(2.+3.*F3A+F3A*F3A)/3.
B3G=B3F*DY31
B3H=(1.-Z31)*DX31*2.*F3A
R3I=B3H*PM31*AN31*(1.+F3A)*(1.+F3A)
C=B3E-R3G+R3I
B3J=PM31*AN31*(1.+F3A)*(1.+F3A)
B3K=(1.-Z31*AK3)+(1.-Z31)*DY31
D=R3J*B3K
AA(1)=A
AA(2)=B
AA(3)=C
AA(4)=D
RETURN
END

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C

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60 PU-MJ FOR ABCD-3 I OPP. BAL.
SUBROUTINE DH3I(F,PM,Z,AK2,AN,DY,DX,R,ROOT,PU,AMU)
DIMENSION H(3)
I=1
H(I)=ROOT
PC3D=H(I)
PC3E=(2.+3.*F+F**F)
PC3F=PC3E/(2.*(1.+F)*(1.+F))
Z3N=PM*AN
Z3M=Z3N*Z
PU31=PC3D*PC3F+Z3M-Z3N
PU=PU31
AM3H=2.*PC3D*PC3D*(1.+F**F)/3.
AM1C=SQRT(1.+4.*F**F*PC3D*PC3D**R)
AM3I=(1.+F)
AM3II=AM3I*AM3I
AM3J=(-5.-10.*F-F**4)
AM3K=(PC3D*PC3D*AM3J)/(20.*AMTC*(1.+F)*(1.+F))
AM3L=(1.+F*PC3D)
AM3M=AM3L*(PC3D*(1.+F)/(1.+PC3D*F)-AK2)

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AM3N=(1.-PC3D)
AMU32=AM3H/(AMTC*AM3I)+AM3K+Z3M*AM3M/AMTC+AM3N*Z3N/AMTC
AMU=AMU32
RETURN
END

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C
C      SUBROUTINE SOLUTION OF CUBIC EQUATION  VAISHNAV  BVM
C      SUBROUTINE QURCSN(A,XR)
C      PROGRAM WILL FIND REAL ROOT ONLY
C      A(1)X**3+A(2)X**2+A(3)X+A(4)=0.
C      DIMENSION A(4),XR(3),AQ(3)
C      A INPUT XR OUTPUT THREE REAL ROOT
      IPATH=2
      EX=1./3.
      IF(A(1))27,37,27
37  XR(1)=0.
      AQ(2)=A(3)
      AQ(3)=A(4)
      GO TO 1035
27  IF(A(4))1006,1004,1006
1004 XR(1)=0.
      GO TO 1034
1006 A2=A(1)*A(1)
      Q=(27.*A2*A(4)-9.*A(1)*A(2)*A(3)+2.*A(2)**3)/(54.*A2*A(1))
      IF(Q)1010,1008,1014
1008 Z=0.
      GO TO 1032
1010 Q=-Q
      IPATH=1
1014 P=(3.*A(1)*A(3)-A(2)*A(2))/(9.*A2)
      ARG=P**3+Q*Q
      IF(ARG)1016,1018,1020
1016 Z=-2.*SQRT(-P)*COS(ATAN(SQRT(-ARG)/Q)/3.)
      GO TO 1028
1018 Z=-2.*Q**EX
      GO TO 1028
1020 SARG=SQRT(ARG)
      IF(P)1022,1024,1026
1022 IF(Q-SARG)1028,1028,1023
1023 Z=-(Q+SARG)**EX-(Q-SARG)**EX
      GO TO 1028
1024 Z=-(2.*Q)**EX
      GO TO 1028
1026 IF(SARG-Q)1028,1028,1027
1027 Z=(SARG-Q)**EX-(SARG+Q)**EX
1028 GO TO (1030,1032),IPATH
1030 Z=-Z
1032 XR(1)=(3.*A(1)*Z-A(2))/(3.*A(1))
1034 AQ(1)=A(1)

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      AQ(2)=A(2)+XR(1)*A(1)
      AQ(3)=A(3)+XR(1)*AQ(2)
1025 CALL QUAD (AQ,XR(2),XR(3),XI)
      IF(XI)57,47,57
      57 XR(2)=0.
      XR(3)=0.
      47 RETURN
      END
C
      SUBROUTINE QUAD(A,XR1,XR2,XI)
      DIMENSION A(3)
      X1=-A(2)/(2.*A(1))
      DISC=X1*X1-A(3)/A(1)
      IF(DISC)10,20,20
      10 X2=SQRT(-DISC)
      XR1=X1
      XR2=X1
      XI=X2
      GO TO 30
      20 X2=SQRT(DISC)
      XR1=X1+X2
      XR2=X1-X2
      XI=0.
      30 RETURN
      END
/*
// EXEC LNKFD1
// ASSGN SYS005,X 280
// EXEC
C      SUBROUTINES FOR CASE 2
**      MP CRITICAL ADJ S. V. VAISHNAV
      SUBROUTINE PMCR(ZW1,ZW3,ZW4,ZW5,ZW6,ZW7,PMCRA,PMBAA)
      EF=2.*ZW1/((ZW5+2.)*ZW1-1.)
      DR=2./15.*ZW1+ZW7/4.
      DD=-ZW3*ZW4/(2.*ZW1)+1./(2.*ZW1)
      DDD=ZW7*(1.-ZW3)/ZW1
      DE=-ZW3*ZW4+1.+ZW6*(1.-ZW3)
      C1=DR*EE*EE
      C2=EE*ZW1*ZW6/4.
      C3=EE*ZW5*(DD+DDD)
      C4=ZW5*DE
      PMCRA=(C1+C2)/(C3+C4)
C      MP BAR ADJ.
      DR0=2.*ZW4*ZW1/(ZW1*(2.-ZW5)-ZW4)
      D1=DR*DR0*DR0
      D2=DR0*ZW1*ZW6/4.
      D3=DR0*ZW5*(DD+DDD)
      D4=ZW5*DE
      PMBAA=(D1+D2)/(D3+D4)

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RETURN
END
** ALPHA U ADJACENT
SUBROUTINE ALPHA(F,ROOT,AL)
AL=(2.*(1.+ROOT/2.))/(F*ROOT)
RETURN
END
** ABCD - 1 II ADJACENT TENSION
SUBROUTINE ABCD1I(TSS,TVV,TVT,TT,T1,T2,TV,DM12,AA)
DIMENSION AA(4)
A=2./15.*TSS+TV/4.
P1=TVV*TVT
P2=P1*TT
P3=P2/TSS
B=P2-(P3*TT/(2.*TSS))-(TVV*T1/(2.*TSS))+(TSS*T2/4.)-(P3*TV/TSS)+(2
1.*P1*TV/TSS)-(TVV*T1*TV/TSS)
C=(2.*P2)-(2.*P3*TT)+(2.*P1*T2)-P3*T2-(TVV*T1*(1.+T2))-(2.*P3*TV)
D=-(2.*P2*TT)-(2.*P2*T2)
AA(1)=A
AA(2)=B
AA(3)=C
AA(4)=D
RETURN
END
** PU-MU FOR ABCD-1 II ADJ. TEN.
60 SUBROUTINE DH1I(F,PM,Z,AK2,AN,DY,DX,R,ROOT,PU,AMU)
DIMENSION H(3)
I=1
H(I)=ROOT
30 TWOF=2.*F
PMN=PM*AN
ONRR00=SQRT(1.+R*R*H(I)**2/(F*F))
TWOMPZ=2.*PM*Z
FH=F*H(I)
FHBY2=(F+H(I))/2.
AAA=FH/FHBY2-AK2
PU=FH/4.+(TWOMPZ*FHBY2/FH)*AAA-PMN
AMU=(7.*FH*H(I))/(60.*ONRR00)
AMU=AMU+((TWOMPZ*FHBY2*FHBY2)/(FH*F*ONRR00))*AAA*AAA
AMU=AMU+PMN*(1.-H(I)+H(I)/TWOF)/ONRR00
RETURN
END
** ABCD-2 II ADJACENT COMP FAILURE
SUBROUTINE ABCD2I(FI1,P22,ZK,AK2A,ANM,DYN1,DXI1,DM21,AA)
DIMENSION AA(4)
P23=P22*ZK
P24=P23*ANM
P21=(FI1*FI1-4.*FI1+4.)
F41=(2.*FI1**4.)

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F42=(2.*FI1 )
A=((2./15.)*FI1+DXI1/4.)
FI22=(1./FI1)-2.
B=-((P22*P21)/(F41)-(P24*AK2A/F42)-(DYN1*FI1/4.)+(P22*FI22)-(P24*D
1XI1)/FI1+(P22/FI1-2.*P22)*DXI1/FI1)
C=-((2.*P22/(FI1*FI1 )*(FI1-2.)-(P24*AK2A)-(P24*DYN1)+2.*P22+((P22/
1FI1-2.*P22)*DYN1)+(2.*P22*DXI1/FI1))
D=-((2.*P22*(1.+DYN1))
AA(1)=A
AA(2)=B
AA(3)=C
AA(4)=D
RETURN
END
**
60 PU-MU FOR ABCD-2 II ADJ. COMP.
SUBROUTINE DH2I(F,PM,Z,AK2,AN,DY,DX,R,ROOT,PU,AMU)
DIMENSION H(3)
I=1
H(I)=ROOT
PD2P=H(I)
PD2Q=(F*PD2P)/4.
PD2R=PM*Z*AN
PD2S=(2.*PM)/(F*PD2P)
PD2T=((F+(PD2P)/2.)-(F*PD2P))
PU22=PD2Q+PD2R-PD2S*PD2T
PU=PU22
BMA=7.*F*PD2P*PD2P
BMR=SQRT(1.+(PD2P*PD2P*R*R)/(F*F))
BMC=BMR*60.
BMD=(F+(PD2P)/2.)
BME=(F*PD2P)/BMD-AK2
BMF=F*F*PD2P
BMG=(BMD-(PD2P)/F)*(BMD-(PD2P)/F)
AMU22=(BMA)/(BMC)+PD2R*BMD*BMF/(BMR*F)+(PD2S/F)*BMG/BMR
AMU=AMU22
RETURN
END
**
ABCD - 3 II ADJACENT BALANCED
SUBROUTINE ABCD3I(FI32,P32,Z3A,AK23,AN3,DYN3,DXI3,DM32,AA)
DIMENSION AA(4)
A=0
B=((2./15.)*FI32+DXI3/4.)
C32=P32*AN3
C32A=(-Z3A*AK23)/(2.*FI32)
C32B=C32A+(1./(2.*FI32))
C32C=FI32*DYN3/4.
C32D=C32*DXI3*(1.-Z3A)/FI32
C=-C32*C32B+C32C-C32D
D=-C32*(-Z3A*AK23+1.+DYN3*(1.-Z3A))

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AA(1)=A
AA(2)=B
AA(3)=C
AA(4)=D
RETURN
END
** PU-MU FOR ABCD-3 II ADJ. BAL.
60 SUBROUTINE DH3I(F,PM,Z,AK2,AN,DY,DX,R,ROOT,PU,AMU)
   DIMENSION H(3)
   I=1
   H(I)=ROOT
   PD3A=H(I)
   PD3B=F*PD3A/4.
   PD3C=PM*AN
   PD3D=PD3C*Z
   PU32=PD3B+PD3D-PD3C
   PU=PU32
   AM32R=7.*F*PD3A*PD3A
   AM1C3=SQRT(1.+((PD3A*PD3A*R*R))/(F*F))
   AM32S=(F+PD3A/2.)/F
   AM32T=((F*PD3A)/(F+PD3A/2.)-AK2)
   AM32U=AM32S*AM32T
   AM32V=(1.-PD3A+PD3A/(2.*F))
   AMU32=AM32R/(60.*AM1C3)+PD3D*AM32U/AM1C3+PD3C*AM32V/AM1C3
   AMU=AMU32
   RETURN
   END

```