```
*==> crneg.f <==
      SUBROUTINE crneg(ars,v1,v2,reject)
      IMPLICIT DOUBLE PRECISION (a-h,o-z)
      LOGICAL reject
      DOUBLE PRECISION ars(*),sqe(48)
      call fdmass(ars,v1,v2,sqe)
      do   i=20,40
          if(sqe(i).lt.0.d0)then
            reject=.true.
            write(96,*)'Eigenmass sqe(',i,') < 0'
            return
          endif
      enddo
      return
      END

*==> sle12.f <==
      SUBROUTINE SLE12(SSL12,SSE12,PS12,PC12,GCA1,GCA2,
     #VXL1,VXL2)
CC
      IMPLICIT DOUBLE PRECISION (A-H, O-Z)
      COMMON/WUR/WUR,CONPI
      COMMON/SCALE/AMGUT,SUSY,AMZ,AMW
      COMMON/SLEP12/SEL12,SER12,SN12
C-------------------------------------------------
C  Returns the sleptons  of the 1,2 generation
C  GC1,2 are the (couplings)^2/(4Pi)^2
C-------------------------------------------------
      VEVXL=DSQRT(2.D0*(VXL1**2+VXL2**2))
      TWBLA=PC12**2-PS12**2
      TH2L=.6D0*GCA1/(.6D0*GCA1+GCA2)
      ZZULA=4.D0*((CONPI*VEVXL)**2)*(.6D0*GCA1+GCA2)
CC
      SLA11=SSL12+ZZULA*TWBLA*(-.5D0+TH2L)
      SLA22=SSE12+ZZULA*TWBLA*(-TH2L)
      SNN12=SSL12+ZZULA*TWBLA*(.5D0)
CC
      IF(SLA11.LE.0.D0.OR.SLA22.LT.0.D0)THEN
        SEL12=1111111.11D0
        SER12=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR SLEPTONS  12'
      ELSE
        SEL12=SUSY*DSQRT(SLA11)
        SER12=SUSY*DSQRT(SLA22)
      ENDIF
CC
      IF(SNN12.LE.0.D0)THEN
        SN12=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUE FOR SNEUTRINO  12'
      ELSE
        SN12=SUSY*DSQRT(SNN12)
      ENDIF
CC
      RETURN
      END

*==> sle3.f <==
      SUBROUTINE SLE3(SSL3,SSE3,ALI,ALL,UMML,PSINL,PCOSL,GC1L,GC2L,
     #VX1L,VX2L)
CC
      IMPLICIT DOUBLE PRECISION (A-H, O-Z)
      COMMON/WUR/WUR,CONPI
```



```
      COMMON/SCALE/AMGUT,SUSY,AMZ,AMW
      COMMON/SLEP3/SLPL,SLMI,SN3
C-------------------------------------------------
C  Returns the sleptons  of the third generation
C  GC1,2 are the (couplings)^2/(4Pi)^2
C-------------------------------------------------
      VEVL=SQRT(2.D0*(VX1L**2+VX2L**2))
      TWBL=PCOSL**2-PSINL**2
      THET2L=.6D0*GC1L/(.6D0*GC1L+GC2L)
      TANYL=PSINL/PCOSL
      ZZUL=4.D0*((CONPI*VEVL)**2)*(.6D0*GC1L+GC2L)
CC
      SL11=SSL3+ALI**2+ZZUL*TWBL*(-.5D0+THET2L)
      SL22=SSE3+ALI**2+ZZUL*TWBL*(-THET2L)
      SL12=ALI*(ALL+UMML*TANYL)
      SN33=SSL3+ZZUL*TWBL*(.5D0)
      DISCRL=(SL11-SL22)**2+4.D0*(SL12**2)
      DISL=DSQRT(DISCRL)
      ROL1=.5D0*(SL11+SL22+DISL)
      ROL2=.5D0*(SL11+SL22-DISL)
CC
      IF(ROL2.LE.0.D0)THEN
        SLPL=1111111.11D0
        SLMI=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR SLEPTONS 3'
      ELSE
        SLPL=SUSY*DSQRT(ROL1)
        SLMI=SUSY*DSQRT(ROL2)
      ENDIF
CC
      IF(SN33.LE.0.D0)THEN
        SN3=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUE FOR SNEUTRINO  3'
      ELSE
        SN3=SUSY*DSQRT(SN33)
      ENDIF
CC
      RETURN
      END

*==> sq21.f <==
      SUBROUTINE SQ21(QQ2,QQ1,UU2,UU1,DD2,DD1,PSINA,PCOSA,
     #GC1A,GC2A,VX1A,VX2A)
      IMPLICIT DOUBLE PRECISION (A-H, O-Z)
      COMMON/WUR/WUR,CONPI
      COMMON/SCALE/AMGUT,SUSY,AMZ,AMW
      COMMON/SQUARK/U1L,U2L,U1R,U2R,D1L,D2L,D1R,D2R
CC
      VEVA=DSQRT(2.D0*(VX1A**2+VX2A**2))
      TWBA=PCOSA**2-PSINA**2
      THET2A=.6D0*GC1A/(.6D0*GC1A+GC2A)
      ZZUA=4.D0*((CONPI*VEVA)**2)*(.6D0*GC1A+GC2A)
CC
      VU2L=(QQ2+ZZUA*TWBA*(.5D0-(2.D0/3.D0)*THET2A))
      VD2L=(QQ2+ZZUA*TWBA*(-.5D0+(1.D0/3.D0)*THET2A))
      VU2R=(UU2+ZZUA*TWBA*((2.D0/3.D0)*THET2A))
      VD2R=(DD2+ZZUA*TWBA*(-(1.D0/3.D0)*THET2A))
      VU1L=(QQ1+ZZUA*TWBA*(.5D0-(2.D0/3.D0)*THET2A))
      VD1L=(QQ1+ZZUA*TWBA*(-.5D0+(1.D0/3.D0)*THET2A))
      VU1R=(UU1+ZZUA*TWBA*((2.D0/3.D0)*THET2A))
      VD1R=(DD1+ZZUA*TWBA*(-(1.D0/3.D0)*THET2A))
CC
```

```
      IF(VU2L.LT.0D0)THEN
        U2L=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR U2L EIGENMASS'
      ELSE
        U2L=SUSY*DSQRT(VU2L)
      ENDIF
CC
      IF(VD2L.LT.0D0)THEN
        D2L=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR D2L EIGENMASS'
      ELSE
        D2L=SUSY*DSQRT(VD2L)
      ENDIF
CC
      IF(VU2R.LT.0D0)THEN
        U2R=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR U2R EIGENMASS'
      ELSE
        U2R=SUSY*DSQRT(VU2R)
      ENDIF
CC
      IF(VD2R.LT.0D0)THEN
        D2R=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR D2R EIGENMASS'
      ELSE
        D2R=SUSY*DSQRT(VD2R)
      ENDIF
CC
      IF(VU1L.LT.0D0)THEN
        U1L=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR U1L EIGENMASS'
      ELSE
        U1L=SUSY*DSQRT(VU1L)
      ENDIF
CC
      IF(VD1L.LT.0D0)THEN
        D1L=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR D1L EIGENMASS'
      ELSE
        D1L=SUSY*DSQRT(VD1L)
      ENDIF
CC
      IF(VU1R.LT.0D0)THEN
        U1R=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR U1R EIGENMASS'
      ELSE
        U1R=SUSY*DSQRT(VU1R)
      ENDIF
CC
      IF(VD1R.LT.0D0)THEN
        D1R=1111111.11D0
        WRITE(96,'(A)')'STRANGE VALUES FOR D1R EIGENMASS'
      ELSE
        D1R=SUSY*DSQRT(VD1R)
      ENDIF
CC
      RETURN
      END

*==> sq3.f <==
      SUBROUTINE SQ3(RMTOP,RMBOT,RMTAU,SINB,COSB,SPAR,
     #V1,V2)
```



```
      IMPLICIT DOUBLE PRECISION (A-H, O-Z)
      DOUBLE PRECISION spar(*)
      COMMON/WUR/WUR,CONPI
      COMMON/SCALE/AMGUT,SUSY,AMZ,AMW
      COMMON/STOPS/STPL,STMI,S1T,S2T,SBPL,SBMI
      COMMON /RENTR/ TTR,QSL
C-------------------------------------------------
C   Returns the stops , sbottoms
C   as well as the correction to the potential
C   GC1,2 are the (couplings)^2/(4Pi)^2
C-------------------------------------------------
      QQ3 = spar(15)
      UU3 = spar(18)
      DD3 = spar(21)
      ATI = rmtop
      ABI = rmbot
      ATT = spar(12)
      ABB = spar(13)
      UMM = spar(10)
      PSIN = sinb
      PCOS = cosb
      GC1 = spar(1)
      GC2 = spar(2)
      VX1 = v1
      VX2 = v2
CC
      VEV=DSQRT(2.D0*(VX1**2+VX2**2))
      TWB=PCOS**2-PSIN**2
      THET2=.6D0*GC1/(.6D0*GC1+GC2)
      TANY=PSIN/PCOS
      ZZU=4.D0*((CONPI*VEV)**2)*(.6D0*GC1+GC2)
CC
      ST11=QQ3+ATI**2+ZZU*TWB*(.5D0-(2.D0/3.D0)*THET2)
      ST22=UU3+ATI**2+ZZU*TWB*((2.D0/3.D0)*THET2)
      ST12=ATI*(ATT+UMM*PCOS/PSIN)
      DISCR=(ST11-ST22)**2+4.D0*(ST12**2)
      DIS=DSQRT(DISCR)
      ROT1=.5D0*(ST11+ST22+DIS)
      ROT2=.5D0*(ST11+ST22-DIS)
      IF(ROT2.LE.0.D0)THEN
         STMI=111111.11D0
         WRITE(96,'(A)')'STRANGE VALUE FOR STMI'
      ELSE
         STMI=SUSY*DSQRT(ROT2)
      ENDIF
      STPL=SUSY*DSQRT(ROT1)
C----------------------------------------------------------------------
C  The scale at which the corrections to the effective potential
C  are evaluated is taken ZZUY (was Mz^2)
C  This is O.K. if all masses ST11 etc are at Mz also. If are taken at a
C  different scale the difference is only two loop so do not worry.
C  This is the same done in the TAP3.FOR
C----------------------------------------------------------------------
           ZZUY=QSL
CC
C---------------------------------------------
C    New procedure of calculating rad. corr.
C---------------------------------------------
      t=2.d0*dlog(amgut/ZZUY)        !  Renorm. scale
      call sigc(spar,v1,v2,t,sig1,sig2)
      S1T = sig1
      S2T = sig2
```

```
CC
      SB11=QQ3+ABI**2+ZZU*TWB*(-.5D0+(1.D0/3.D0)*THET2)
      SB22=DD3+ABI**2+ZZU*TWB*(-(1.D0/3.D0)*THET2)
      SB12=ABI*(ABB+UMM*TANY)
      DISCRB=(SB11-SB22)**2+4.D0*(SB12**2)
      DISB=DSQRT(DISCRB)
      BOT1=.5D0*(SB11+SB22+DISB)
      BOT2=.5D0*(SB11+SB22-DISB)
      IF(BOT2.LE.0.D0)THEN
         SBMI=111111.11D0
         WRITE(96,'(A)')'STRANGE VALUE FOR SBMI'
      ELSE
         SBMI=SUSY*DSQRT(BOT2)
      ENDIF
      SBPL=SUSY*DSQRT(BOT1)
CC
      RETURN
      END

*==> radh.f <==
      SUBROUTINE RADH(AT,AB,AM,AAM3,BE,AC1,AC2,YT,YB,AMQ,AMU
     #,AMD,V1,V2,SIP,REJECT)
      IMPLICIT DOUBLE PRECISION (A-H, O-Z)
      LOGICAL REJECT
CC      COMMON/WUR/WUR,CONPI
      COMMON/SCALE/AMGUT,SUSY,AMZ,AMW
      COMMON/HI/RAPA,RAHO,RAHOO,RACH
CC
      CCAY=DCOS(BE)
      SSAY=DSIN(BE)
      YUR=4.D0*DACOS(-1.D0)
      AMWSQ=(AC2*(YUR**2)/2.D0)*(V1**2+V2**2)
      AMWE=DSQRT(AMWSQ)
CC
      RATY=AC2/(AC2+.6D0*AC1)
      AMZE=AMWE/(DSQRT(RATY))
CC
      TOPY=(DSQRT(YT*(YUR**2)))*V2
      BOTY=(DSQRT(YB*(YUR**2)))*V1
CC
      WMASS=SUSY*AMWE
      ZMASS=SUSY*AMZE
CC
      CO2Y=(CCAY**2-SSAY**2)
      YPOTY=(.5D0*(AMQ-AMU)+(8.D0*AMWE**2-5.D0*AMZE**2)*CO2Y/12.D0)**2
     #+(TOPY**2)*(AT+AM*CCAY/SSAY)**2
      TA1Y=TOPY**2+.5D0*(AMQ+AMU)+.25D0*(AMZE**2)*CO2Y+DSQRT(YPOTY)
      TA2Y=TOPY**2+.5D0*(AMQ+AMU)+.25D0*(AMZE**2)*CO2Y-DSQRT(YPOTY)
CC
      YPOBY=(.5D0*(AMQ-AMD)-(4.D0*AMWE**2-AMZE**2)*CO2Y/12.D0)**2
     #+(BOTY**2)*(AB+AM*SSAY/CCAY)**2
      BA1Y=BOTY**2+.5D0*(AMQ+AMD)-.25D0*(AMZE**2)*CO2Y+DSQRT(YPOBY)
      BA2Y=BOTY**2+.5D0*(AMQ+AMD)-.25D0*(AMZE**2)*CO2Y-DSQRT(YPOBY)
CC
       ZZMY=SIP**2
CC
      CORRC=-1.5D0*(AC2/(SSAY**2))*(TOPY**2/AMWE**2)*(AT*AM)*
     #S(TA1Y,TA2Y,ZZMY)
     #-1.5D0*(AC2/(CCAY**2))*(BOTY**2/AMWE**2)*(AB*AM)*
     #S(BA1Y,BA2Y,ZZMY)
CC
      FX1Y=S(TA1Y,TA2Y,ZZMY)
```



```
      FX2Y=S(BA1Y,BA2Y,ZZMY)
      GFTRY=-2.D0*AAM3
CC
      DELY=-2.D0*AAM3+CORRC
CC
      TO4Y=(TOPY**4)/(SSAY**2)
      BO4Y=(BOTY**4)/(CCAY**2)
CC
      OGTYH=DLOG((TA1Y*TA2Y)/(TOPY**4))
      OGBYH=DLOG((BA1Y*BA2Y)/(BOTY**4))
CC
      ZETY=(AT+AM*CCAY/SSAY)/(TA1Y-TA2Y)
      ZEBY=(AB+AM*SSAY/CCAY)/(BA1Y-BA2Y)
CC
      D11Y=BO4Y*(OGBYH+2.D0*AB*ZEBY*DLOG(BA1Y/BA2Y))+BO4Y*((AB*ZEBY)**2)
     #*G(BA1Y,BA2Y)+TO4Y*((AM*ZETY)**2)*G(TA1Y,TA2Y)
CC
      D22Y=TO4Y*(OGTYH+2.D0*AT*ZETY*DLOG(TA1Y/TA2Y))+TO4Y*((AT*ZETY)**2)
     #*G(TA1Y,TA2Y)+BO4Y*((AM*ZEBY)**2)*G(BA1Y,BA2Y)
CC
      D12Y=TO4Y*AM*ZETY*(DLOG(TA1Y/TA2Y)+AT*ZETY*G(TA1Y,TA2Y))+
     #BO4Y*AM*ZEBY*(DLOG(BA1Y/BA2Y)+AB*ZEBY*G(BA1Y,BA2Y))
CC
      SFFY=(AMZE**2)*(2.D0*SSAY*CCAY)
      W11Y=(CCAY/SSAY)*SFFY+(SSAY/CCAY)*DELY+6.D0*(AC2/(AMWE**2))*D11Y
      W22Y=(SSAY/CCAY)*SFFY+(CCAY/SSAY)*DELY+6.D0*(AC2/(AMWE**2))*D22Y
      W12Y=-SFFY-DELY+6.D0*(AC2/(AMWE**2))*D12Y
C----------------------------------------------------------------------
C  To pass to mass matrix elements should divide by 2 as is done below
C  (see for instance Drees+Nojiri)
C----------------------------------------------------------------------
      X11Y=.5D0*W11Y
      X22Y=.5D0*W22Y
      X12Y=.5D0*W12Y
      YPER=(X11Y-X22Y)**2+4.D0*(X12Y**2)
      EIG1Y=.5D0*(X11Y+X22Y+DSQRT(YPER))
      EIG2Y=.5D0*(X11Y+X22Y-DSQRT(YPER))
CC
      ARSQ=AMWSQ+DELY/(2.D0*SSAY*CCAY)
      IF(ARSQ.GE.0.D0)THEN
         RACH=DSQRT(ARSQ)
      ELSE
         WRITE(96,'(a)')'WE CAN NOT PROCEED  RACH IMAGINARY !!!'
         REJECT=.TRUE.
      ENDIF
CC
      IF(EIG2Y.LT.0.D0  .OR. DELY.LT.0.D0)THEN
         RAPA=111111.D0
         RAHOO=111111.D0
         RAHO=111111.D0
         WRITE(96,'(A)')'HIGGS RAD. CORRECT. ARE STRANGE'
      ELSE
         RAPA=SUSY*DSQRT(DELY/(2.D0*SSAY*CCAY))
         RAHO=SUSY*DSQRT(EIG2Y)
         RAHOO=SUSY*DSQRT(EIG1Y)
      ENDIF
CC
      RETURN
      END

*==> higgs.f <==
      SUBROUTINE HIGGS(S1,S2,TCOS,TSIN)
```

```
      IMPLICIT DOUBLE PRECISION (A-H, O-Z)
CC       COMMON/WUR/WUR,CONPI
      COMMON/SCALE/AMGUT,SUSY,AMZ,AMW
      COMMON/HIG/HIGGA,HIGGC,HIGN1,HIGN2
CC
      HIGGA=SUSY*DSQRT(S1+S2)
      HIGGC=DSQRT(HIGGA**2+(AMW*SUSY)**2)
      SIMP=((HIGGA/SUSY)**2+AMZ**2)
      SROUT=SIMP**2-(2.D0*HIGGA*AMZ*(TCOS**2-TSIN**2)/SUSY)
     #**2
      VROUT=DSQRT(SROUT)
CC
      SUSY2=SUSY**2
      AHIGN1=.5D0*(SIMP+VROUT)*SUSY2
      AHIGN2=.5D0*(SIMP-VROUT)*SUSY2
      HIGN1=DSQRT(AHIGN1)
      HIGN2=DSQRT(AHIGN2)
      RETURN
      END

*==> neucha.f <==
      SUBROUTINE NEUCHA(X1,X2,XM,CCOS,SSIN,G1,G2)
      IMPLICIT DOUBLE PRECISION (A-H, O-Z)
      COMMON/WUR/WUR,CONPI
      COMMON/FS/H1P,H1M,FM1,FM2,FM3,FM4
      COMMON/SCALE/AMGUT,SUSY,AMZ,AMW
      COMMON/VEVW/VOO
C-------------------------------------------------------------------
C  X1,2 are the gaugino masses M1,M2 in units of SUSY scale.
C  XM is the parameter "mu". G1,2 are the couplings g^2/(4Pi)^2 !.
C  Ccos,ssin are  the cos and sin of the angle beta
C  The subroutine returns the neutralino masses FM1,2,3,4,
C  and chargino masses H1P,H1M
C-------------------------------------------------------------------
      VAL=VOO/SUSY
      VVAL=VAL*DSQRT(2.D0)
      W1=X1
      W2=X2
      W12=0.D0
      Z3=0.D0
      Z4=0.D0
      AM=XM
CC
      CG1=(4.D0*CONPI)*DSQRT(G1)
      CG2=(4.D0*CONPI)*DSQRT(G2)
CC
      A1=(DSQRT((3.D0/5.D0)/2.D0))*VAL*CCOS*CG1
      A2=-(DSQRT((3.D0/5.D0)/2.D0))*VAL*SSIN*CG1
      B1=-(DSQRT(1.D0/2.D0))*VAL*CCOS*CG2
      B2=(DSQRT(1.D0/2.D0))*VAL*SSIN*CG2
C---------------------------------------------------------------
C
C THE FOLLOWING SOLVES THE EIGENVALUE PROBLEM FOR THE MATRIX:
C
C               W1    W12     A1    A2
C
C               W12    W2      B1    B2
C
C               A1     B1    Z3    -AM
C
C               A2     B2   -AM     Z4
C
```



```
C---------------------------------------------------------------
      E3=-.25D0*(W1+W2+Z3+Z4)
CC
      EE1=(W1*(B1**2+B2**2+AM**2)+
     #W2*(A1**2+A2**2+AM**2)+
     #2.D0*AM*(A1*A2+B1*B2))/4.D0
      E12=(W12**2)*(Z3+Z4)-W1*W2*(Z3+Z4)-(W1+W2)*Z3*Z4
     #+Z4*(A1**2+B1**2)+Z3*(A2**2+B2**2)
     #-2.D0*W12*(A1*B1+A2*B2)
      E1=EE1+E12/4.D0
CC
      EE2=(W1*W2-AM**2-A1**2-A2**2-B1**2-B2**2)
     #/6.D0
      E32=-(W12**2)+(W1+W2)*(Z3+Z4)+Z3*Z4
      E2=EE2+E32/6.D0
CC
      EEO=-2.D0*AM*(A1*A2*W2+B1*B2*W1)+(A1*B2-A2*B1)**2
     #-W1*W2*(AM**2)
      EEI=(AM*W12)**2-(W12**2)*Z3*Z4+W1*W2*Z3*Z4
     #-W2*Z4*(A1**2)-W2*Z3*(A2**2)
     #-W1*Z4*(B1**2)-W1*Z3*(B2**2)
     #+2.D0*W12*Z4*A1*B1+2.D0*W12*Z3*A2*B2
     #+2.D0*AM*W12*(A1*B2+A2*B1)
      EO=EEO+EEI
CC
      AV=6.D0*(E2-E3**2)
      BV=4.D0*(E1-3.D0*E2*E3+2.D0*(E3**3.D0))
      CV=EO-3.D0*(E3**4.D0)+6.D0*E2*(E3**2)-4.D0*E1*E3
      AVS=AV/2.D0
      BVS=(AV**2-4.D0*CV)/16.D0
      CVS=-(BV/8.D0)**2
      PV=(AVS**2-BVS*3.D0)/9.D0
      QV=.5D0*(AVS*BVS/3.D0-CVS-2.D0*(AVS**3.D0)/27.D0)
      PV1=PV**3.D0
C
C      QV1=QV**2
C
      TV=QV/DSQRT(PV1)+.00000000000001D0
      FV=DACOS(TV)
      FFV=FV/3.D0
      YV1=2.D0*(DSQRT(PV))*DCOS(FFV)
      YV2=-YV1/2.D0+(DSQRT(3.D0*PV))*DSIN(FFV)
      YV3=-YV1/2.D0-(DSQRT(3.D0*PV))*DSIN(FFV)
      RV1=YV1-AVS/3.D0
      RV2=YV2-AVS/3.D0
      RV3=YV3-AVS/3.D0
      RVV1=DABS(RV1)
      RVV2=DABS(RV2)
      RVV3=DABS(RV3)
      AJ1=DSQRT(RVV1)
      AJ2=DSQRT(RVV2)
      AJ3=DSQRT(RVV3)
      IF(BV.LT.0.D0)THEN
        FM1=AJ1-AJ2-AJ3-E3
        FM2=AJ2-AJ3-AJ1-E3
        FM3=AJ3-AJ2-AJ1-E3
        FM4=AJ1+AJ2+AJ3-E3
      ELSE
        FM1=AJ2+AJ3-AJ1-E3
        FM2=AJ3+AJ1-AJ2-E3
        FM3=AJ1+AJ2-AJ3-E3
        FM4=-AJ1-AJ2-AJ3-E3
```

```
      ENDIF
      FM1=FM1*SUSY
      FM2=FM2*SUSY
      FM3=FM3*SUSY
      FM4=FM4*SUSY
C-------------------------
C   CHARGINOS BELOW
C-------------------------
      WON=VVAL*CG2*.5D0
      SSONY=2.D0*SSIN*CCOS
      EX1=(X2-XM)**2+2.D0*(WON**2)*(1.D0+SSONY)
      EX2=(X2+XM)**2+2.D0*(WON**2)*(1.D0-SSONY)
      SEG=X2**2+XM**2+2.D0*(WON**2)
      HPLUS=.5D0*(SEG+DSQRT(EX1*EX2))
      HMINS= .5D0*(SEG-DSQRT(EX1*EX2))
      H1P=SUSY*DSQRT(HPLUS)
      H1M=SUSY*DSQRT(HMINS)
      RETURN
      END
```