

APPENDIX

Program 4.1

```

c      to calculate JD
      implicit real*8 (A-Z)
      integer*4 yr,mn,A,B,C,D,date,oct15
      parameter(oct15=15821015)
      write(*,*) 'give yr,mn,dy'
      read(*,*) yr,mn,dy
      y1=yr
      if(yr.LT.0) y1=yr+1
      m1=mn
      if(mn.LT.3) then
        y1=y1-1
        m1=mn+12
      end if
      if(y1.LT.0) then
        C=int(365.25*y1-.75+.5)-694025
      else
        C=int(365.25*y1)-694025
      end if
      D=int(30.6001*(m1+1))
      A=int(y1/100)
      date=yr*10000+mn*100+dy
      if(date.LT.oct15) then
        B=0
      else
        B=2-A+int(A/4)
      end if
      DJ=B+C+D+dy-.5
      JD=DJ+2415020.0
      write(*,*) 'dj=',DJ
      write(*,*) 'jd=',JD
      end

```

Program 4.2

```

c      to calculate LST
      integer*4 YR,D,P,G,H,A,B
      real DJ,UT,T,T0,SG,LST,LAM,K,L,R0,R1,X,Q,S,I,F,C
      open(1,file='UT-CB39.DAT',status='old')
      open(2,file='LST-CB39.DAT',status='new')
10     read(1,*,end=20)A,B,C,DJ,YR
      T=(DJ/36525)-1
      RO=(5.13E-2*T)+(2.59E-5*T*T)-(1.72E-9*T**3)
      R1=6.70+(2400*(T-((YR-2000)/100)))
      X=R0+R1
      T0=X-(INT(X/24)*24)
      K=B/60.0
      L=C/3600.0
      UT=A+K+L
      Q=(UT*1.00)+T0
      SG=Q-(INT(Q/24)*24)
      D=SG
      P=(SG-D)*60
      F=60*(60*(SG-D)-P)
      LAM=5.264
      S=SG+LAM
      LST=S-(INT(S/24)*24)
      G=LST
      H=(LST-G)*60
      I=60*(60*(LST-G)-H)
      write(2,*)'LST IS',LST

```

Program 4.3

```
C      TO CALCULATE HA
      IMPLICIT REAL*8 (A-Z)
      INTEGER*4 A, B, D, E
      OPEN (1, FILE='RA-LST39.DAT', STATUS='OLD')
      OPEN (2, FILE='HA39.DAT', STATUS='old')
10     READ (1, *, END=20) A, B, C, LST
      G=B/60.0
      H=C/3600.0
      RA=A+G+H
      HA=15*(LST-RA)
      WRITE (2, *) 'HA IS', HA
      GO TO 10
20     CONTINUE
      END
```

Program 4.4

```
C      TO CALCULATE AIRMASS(X) AND (kX)
      IMPLICIT REAL*8(A-Z)
      INTEGER*4 A, B, D, E
      OPEN(1, FILE='DEL-HA39.DAT', STATUS='OLD')
      OPEN(2, FILE='AIRMASS39.DAT', STATUS='old')
10     READ(1, *, END=20) A, B, C, HA, k
      D=32
      E=46
      F=46
      P=E/60.0
      Q=F/3600.0
      PHI=D+P+Q
      G=B/60.0
      H=C/3600.0
      DEL=A+G+H
      PHI=PHI*3.1416/180.0
      DEL=DEL*3.1416/180.0
      HA=HA*3.1416/180.0
      X=1/(SIN(PHI)*SIN(DEL)+COS(PHI)*COS(DEL)*COS(HA))
      X=X-0.0018167*(X-1)
      kX=k*X
      WRITE(2, *) 'AIRMASS X AND kX IS', X, kX
      GO TO 10
20     CONTINUE
      END
```

Program 4.5

```

C      TO CALCULATE AIRMASS CORRECTED MAG(ACM)
      REAL M(30), KX, ACM(3, 30)
      PARAMETER(NUM=21)
      OPEN(1, FILE='norm39.DAT', STATUS='OLD')
      OPEN(2, FILE='ACM39n.DAT', STATUS='new')
      DO 50 I=1, 3
      READ(1, *) (M(J), J=1, NUM), KX
C      WRITE(2, *) 'SET: ', I
      DO 50 J=1, NUM
50     ACM(I, J)=M(J)-KX
      DO 60 J=1, NUM
60     WRITE(2, '(3F10.2)') (ACM(I, J), I=1, 3)
      END

```

Program 4.6

```

C      TO FIND CALIBRATED MAG(CAL.)
      PARAMETER(NUM=21)
      REAL M(30), DELM, CALCUMAG(3, 30)
      OPEN(1, FILE='ACM39.DAT', STATUS='OLD')
      OPEN(2, FILE='CAL39n.DAT', STATUS='new')
      DO 50 I=1, 3
      READ(1, *) (M(J), J=1, NUM), DELM
      DO 50 J=1, NUM
50     CALCUMAG(I, J)=M(J)+DELM
      DO 60 J=1, NUM
60     WRITE(2, '(3F10.2)') (CALCUMAG(I, J), I=1, 3)
      END

```

Program 4.7

```
c      TO FIND COLOUR EXCESS AND DEREDDENED MAG.
      OPEN(1, FILE='CAL39.DAT', STATUS='OLD')
      OPEN(2, FILE='DEREDBVR39-4.5.DAT', STATUS='old')
10     READ(1, *, END=20) B, V, R
      V0=V
      B0=B
      R0=R
      BMVJ=B0-V0
      do 7 j=1,100
      BMV0=-0.104*(V0-R0)**2+1.355*(V0-R0)-0.080
      EBMV0=BMVJ-BMV0
      if(EBMV0.le.0.00) go to 8
      V0=V-4.5*EBMV0
      R0=R-4.5*0.79*EBMV0
      B0=B-4.5*1.23*EBMV0
      BMVJ=B0-V0
7      continue
8      WRITE(2, '(4F10.2)') B0, V0, R0, EBMV0
      GO TO 10
20     CONTINUE
      END
```

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