```
C
C ***************************************************************************
C *                                                                         *
C *                          R E F J E T                                    *
C *                                                                         *
C *                       A.H.BRIDLE 25-Mar-81                              *
C *                            Version 1.2                                  *
C *                                                                         *
C * COMPUTES JET REFRACTION FOR JET IN SPHEROIDAL OR CHAN-HENRIKSEN         *
C * ATMOSPHERES AT OBLIQUE ANGLES TO SYMMETRY AXES OF THE ATMOSPHERIC       *
C * PRESSURE DISTRIBUTION. PLOTS INTRINSIC SOURCE SHAPE AND THAT SEEN       *
C * BY OBSERVER AT SPECIFIED ANGLES TO THE PRESSURE SYMMETRY AXES.          *
C *                                                                         *
C * BASED ON ALGORITHMS GIVEN BY HENRIKSEN, VALLEE AND BRIDLE (1981)        *
C *                              ASTROPHYSICAL JOURNAL, IN PRESS            *
C ***************************************************************************
C
      DIMENSION Z(250),Y(250),ZD(250),PZ(250),PY(250),DPZDPY(250)
      REAL M1,M2
C
CODE FOR DEBUGGING ON TERMINAL.  DISABLE BY PUTTING DEBUG=.FALSE.
C                                ENABLE  BY PUTTING DEBUG=.TRUE.
C
      LOGICAL DEBUG
      COMMON/DEBUG/DEBUG
      DEBUG=.FALSE.
C
COMPUTER DATE ACQUISITION TO DOCUMENT EXECUTION
C
      DIMENSION DAT(2)
      CALL DATE(DAT)
      WRITE(5,9) DAT
    9 FORMAT(1H1,'REFRACTED JET COMPUTATION   AHB Version 1.2 coded
     * 25-Mar-81',/,26('='),/,' EXECUTION ON ',2A5)
C
CONSTANTS FOR KPC-->CM and DEG-->RAD CONVERSIONS
C
      OKPC=3.0857E+21
      PI=3.14159
      ODEG=PI/180.
C
C     INPUT SOURCE PARAMETERS ********************************************
C
  999 WRITE(5,10)
   10 FORMAT(' RATIO OF SPECIFIC HEATS IN JET (GAMMA) ?')
   11 FORMAT(F10.3)
      READ(5,11) GAMA
      WRITE(5,12)
   12 FORMAT(' INPUT MODEL CODE: 1=SPHEROID, 2=CH ')
      READ(5,13) MODEL
   13 FORMAT(I1)
      IF (MODEL.EQ.2) GO TO 100
C
C     AS (MODEL.EQ.1) WE PICK UP SPHEROIDAL INPUTS THIS TIME
C
      WRITE(5,14)
   14 FORMAT(' INPUT SPHEROID PARMS: ALPHA, PS/PIG, A2(KPC), A3(KPC)')
      READ(5,11) ALPHA
      READ(5,11) PSOPIG
      READ(5,11) A2
      READ(5,11) A3
      WRITE(5,15)
   15 FORMAT(' INPUT START PARMS: ZS(KPC), YS(KPC), PHIS(DEG)')
      READ(5,11) ZS
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06500         READ(5,11) YS
06600         READ(5,11) PHIS
06700         GO TO 110
06800   C
06900   C     AS (MODEL.EQ.2) PICK UP THE CH INPUTS THIS TIME
07000   C
07100     100 WRITE(5,16)
07200      16 FORMAT(' INPUT CH PARMS: ZS(KPC),M1,ZE(KPC),ZH(KPC),M2')
07300         READ(5,11) ZS
07400         READ(5,11) M1
07500         READ(5,11) ZE
07600         READ(5,11) ZH
07700         READ(5,11) M2
07800         WRITE(5,17)
07900      17 FORMAT(' INPUT START PARMS: YS(KPC), PHIS(DEG)')
08000         READ(5,11) YS
08100         READ(5,11) PHIS
08200   C
08300   CONTINUE GETTING THE SETUP PARAMETERS THAT DON'T DEPEND ON MODEL
08400   C
08500     110 WRITE(5,18)
08600      18 FORMAT(' INPUT INITIAL RATIO OF PRESSURE TO RHO*V*V')
08700         READ(5,11) PSORVS
08800         WRITE(5,19)
08900      19 FORMAT(' INPUT ITERATION PARMS: STEP(KPC), # OF STEPS (<250)')
09000         READ(5,11) STEP
09100         READ(5,20) NPTS
09200      20 FORMAT(I3)
09300         WRITE(5,21)
09400      21 FORMAT(' INPUT ANGLES TO LINE OF SIGHT: THETA(DEG), PHI(DEG)')
09500         READ(5,11) THETA
09600         READ(5,11) PHI
09700   C
09800   C     END OF PARAMETER INPUTS ****************************************
09900   C
10000   C
10100   CHECK THE INPUTS ON THE TERMINAL
10200   C
10300         IF(MODEL.EQ.2) GO TO 120
10400         WRITE(5,22) ALPHA,PSOPIG,A2,A3,ZS,YS,PHIS
10500      22 FORMAT(' SPHEROIDAL ATMOSPHERE SPECIFIED AS FOLLOWS:',/,
10600        *       ' PRESSURE INDEX ALPHA                          ',F10.3,/,
10700        *       ' PRESSURE RATIO PS/PIG                         ',F10.3,/,
10800        *       ' PRINCIPAL AXIS A2 (KPC)                       ',F10.3,/,
10900        *       ' MINOR AXIS A3 (KPC)                           ',F10.3,//,
11000        *       ' INITIAL PARAMETERS OF JET:',/,
11100        *       ' OFFSETS FROM PRESSURE CENTER, ZS,YS (KPC)  ',F10.3,F9.3,/,
11200        *       ' ANGLE TO SYMMETRY PLANE OF PRESSURE (DEG)  ',F10.3)
11300         GO TO 125
11400   C
11500   CH MODEL PARAMETERS IF (MODEL.EQ.2)
11600   C
11700     120 WRITE(5,23) ZS,M1,ZE,ZH,M2,PHIS
11800      23 FORMAT(' CH ATMOSPHERE SPECIFIED AS FOLLOWS:          ',/,
11900        *       ' SONIC HEIGHT ZS (KPC)                         ',F10.3,/,
12000        *       ' FIRST PRESSURE INDEX                          ',F10.3,/,
12100        *       ' EQUAL-PRESSURE HEIGHT ZE (KPC)                ',F10.3,/,
12200        *       ' SCALE HEIGHT OF SECOND PRESSURE ZH (KPC)      ',F10.3,/,
12300        *       ' SECOND PRESSURE INDEX                         ',F10.3,//,
12400        *       ' INITIAL PARAMETERS OF JET:',/,
12500        *       ' ANGLE TO SYMMETRY PLANE OF PRESSURE (DEG)  ',F10.3)
12600   C
12700   CONTINUE WITH PARAMETERS IN COMMON TO BOTH MODELS
12800   C
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