```
      IF(ABS(P(J)) .LE. 1.0E-5) P(J)=1.0134E-6
      V(J)=VN
      Q(J)=QA
      IF(TLIMA(J).GE.TLIMB) GO TO 129
      JCRIT=J
      TLIMB=TLIMA(J)
  129 IF(P(J)+Q(J).LE.PPEAK) GO TO 131
      PPEAK=(P(J)+Q(J))
C     "JPMAX" IS THE VALUE OF J FOR WHICH PPEAK TAKES ITS MAXIMUM VALUE.
      JPMAX=J
  131 J=J+1
      J1=J+1
      JT=J1+1
C     "JSTAR" IS A VALUE OF J AHEAD OF THE WAVE FRONT AT WHICH COMPUTING
C     STOPS PREPARATORY TO ADVANCING TIME BY ANOTHER INCREMENT.  JSTAR
C     IS ADVANCED BY UNITY WHENEVER PARTICLE VELOCITY, U(JSTAR),
C     BECOMES NON-NEGLIGIBLE.
      IF(J.LE.JSTAR+1) GO TO 70
C-----TEST TO ADVANCE JSTAR
      IF(ABS(U(JSTAR+1)).GT.1.0E-5) JSTAR=JSTAR+1
      IF((CYCLE.EQ.CYCLES).OR.(TIMES.GE.TQUIT).OR.(J.EQ.JQUIT))GO TO 169
      IF(CYCLE.GT.10)COUNTS=20
C     TO CHANGE FREQUENCY OF PRINT-OUT, A STATEMENT CAN BE INSERTED
C     HERE:  "IF (CYCLE.GT. K) COUNTS=MN" WHERE "K" AND "MN" ARE
C     INTEGERS TO BE CHOSEN BY THE PROGRAMMER.
      IF(MOD(CYCLE,COUNTS).NE.0) GO TO 180
      GO TO 170
  169 LAST=1
  170 JPB=1
      JPE=JSTAR+2
      CALL WRITE
  180 DTNH1=0.6*TLIMB
      IF(DTNH1/DELT.GT.1.1) DTNH1=1.1*DELT
      IF(DTNH1.GT.DTMX) DTNH1=DTMX
      DTN=DELT
      DELT=DTNH1
      DELTI=DTN+DELT
      GO TO 40
C
  951 FORMAT(1H1,6X,3HALP,9X,4HDELT,11X,4HDTMX,11X,4HCONA,12X,2HCQ/7X,I1
     -,4F15.6)
  957 FORMAT(1HO,8X,2HS1,5X,8HBURN()../8X,I2,9X,9I5/2X)
  961 FORMAT(1HO,5X,3HTAU,16X,5HLEFTP,14X,4HU(1),15X,6HOPTION/3E19.8,I8)
      END
      SUBROUTINE DECIDE
C
      COMMON /C1ZON/ H(9),BURN(9),L(9),DX(9),S1,RHO(9)
      COMMON /C2TIME/ TIMES,CYCLE,DELT,DTN,DTMX,TLIMA(300),JCRIT,
     1  TQUIT,TAU
      COMMON /C3CTRL/ COUNTS,JSTAR,JPE,JPB,JQUIT,LAST,CYCLES
      COMMON /C4FLOW/ U(300),V(300),X(300),Q(300),P(300),E(300),QA,VN,
     1 MASS(300),CSP(300)
      COMMON /C7GNRL/ ALP,OPTION,CONA,CQ,LEFTP
      DIMENSION ZON(9)
C
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```
      INTEGER  H,BURN,S,S1,ZON,CYCLE,COUNTS,CYCLES,ALP,OPTION,H2,HS1,HS,
     1  BURNS,HS2
      REAL  L,MASS,LINEAR,LEFTP
C
C     CHOOSE GEOMETRY.  ALP IS AN INTEGER LABEL WHICH IS TO BE SET
C     ACCORDING TO THE GEOMETRY OF THE PROBLEM.
C     X IS THE EULERIAN SPACE COORDINATE.  THE INITIAL VALUE AT T=0
C     OF THE LEFT BOUNDARY OF CELL 1 IS SET HERE.  THE POSITIONS OF
C     OTHER CELL BOUNDARIES ARE CALCULATED IN MAIN FROM THE NUMBER OF
C     ZONES AND THE DIMENSIONS OF THE PROBLEM.
C     FOR CYLINDRICAL AND SPHERICAL PROBLEMS, LEFT BOUNDARY IS
C     INTERPRETED AS INNER BOUNDARY.
C         ALP = 1 FOR PLANE GEOMETRY
C         ALP = 2 FOR CYLENDRICAL GEOMETRY
C         ALP = 3 FOR SPHERICAL GEOMETRY
      ALP=1
C-----CHOOSE COORDINATES OF FIRST CELL
      X(1)=0.0
C-----NUMBER OF REGIONS PLUS ONE (NOT TO EXCEED 9)
C     THIS PROGRAM CAN BE RUN WITH SEVERAL REGIONS OF DIFFERENT
C     MATERIALS.  THE NUMBER OF SUCH REGIONS IS DENOTED BY AN INTEGER
C     S1-1.  THIS PECULIAR CONVENTION ARISES BECAUSE OF A CHARACTERISTIC
C     OF FORTRAN--ZERO INDICES ARE NOT ALLOWED.  EACH DISTINCT REGION IS
C     DENOTED BY AN INTEGER LABEL S.  S=2 IS THE LEFT-MOST REGION, S=3
C     THE NEXT TO THE RIGHT, ETC. UP TO S1.
C     EACH REGION IS DIVIDED INTO A NUMBER OF SPACE ZONES OR CELLS,
C     ZON(S).  THE NUMBER OF CELLS UP TO AND INCLUDING REGION S
C     (STARTING WITH THE LEFTMOST REGION) IS H(S)=SUM(ZON(K)),
C     K=2 TO S, INCLUSIVE.
      S1=2
C-----MATERIAL IN REGIONS
C     "BURN(S)" IS AN INTEGER LABEL WHICH DEFINES THE MATERIAL OF
C     REGION S.
C         BURN(S) = 1 FOR EXPLOSIVE
C         BURN(S) = 2 FOR VOID
C         BURN(S) = 3 FOR LIQUID
C         BURN(S) = 4 FOR SOLID
C         BURN(S) = 5 FOR PHASE TRANSITION
      BURN(2)=5
C-----SET OPTION
C     "OPTION" IS AN INTEGER LABEL WHICH DESCRIBES THE TYPE OF PROBLEM
C     TO BE SOLVED.  IF OPTION=1,2, OR 3, THE PROBLEM IS ONE IN WHICH
C     A SPECIFIED PRESSURE IS APPLIED TO THE LEFT HAND BOUNDARY.  IF
C     OPTION=5, AN EXPLOSIVE REGION IS INCLUDED AND ITS DETONATION
C     PROVIDES THE DRIVING FORCE.  OPTION=6 MEANS THAT THE FIRST REGION
C     (S=2) IS A FLYER PLATE WHICH HAS JUST COLLIDED WITH THE SECOND
C     REGION (S=3) AT THE START OF THE PROBLEM.  WHEN THIS HAPPENS,
C     EACH CELL IN REGION 1 (S=2) IS GIVEN THE FLYER PLATE VELOCITY
C     U(1), EXCEPT THE ONE ADJACENT TO REGION 2(S=3) THIS CELL AND THE
C     FIRST CELL IN REGION 2 (S=3) ARE GIVEN VELOCITIES U(1)/2 FOR
C     SMOOTHING PURPOSES.  WHEN OPTION=1, THE TIME DURATION, TAU, OF
C     THE APPLIED PRESSURE MUST BE SET.  FOR A CONSTANT PRESSURE APPLIED
C     AT T=0, SET TAU EQUAL TO A LARGE NUMBER, SAY 500 (MICROSECONDS).
C     FOR OPTION=2, TIME TAU IS THE TIME AT WHICH THE APPLIED PRESSURE
C     EQUALS ZERO IN A LINEAR RAMP.  OPTION=3 HAS A BUILT-IN TIME
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