ADAS Subroutine dipsum

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C
      REAL FUNCTION DIPSUM*8(JZ,L,E1,E2)
      IMPLICIT REAL*8(A-H,O-Z)
C
C PURPOSE: Calculates a Burgess Dipole Sum.
C
C CALCULATES THE SUM GIVEN IN EQUATIONS (10) AND (11) OF A. BURGESS,
C J. PHYS. B7,?,1974. SET JZ TO ZERO FOR THE ZERO CHARGE (NEUTRAL
C ATOM) CASE. SET L TO THE LOWER LIMIT OF SUMMATION (MUST BE GREATER
C THAN ZERO). SET E1=(KAPPA1)**2 FOR NON ZERO CHARGE, =(K1)**2
C FOR ZERO CHARGE. SET E2=(KAPPA2)**2 FOR NON ZERO CHARGE,
C =(K2)**2 FOR ZERO CHARGE.
C-----------------------------------------------------------------------
C
C  VERSION  : 1.1
C  DATE     : ?
C  MODIFIED : H P Summers
C              - Initial version.
C
C  VERSION  : 1.2
C  DATE     : 16-05-2007
C  MODIFIED : Allan Whiteford
C              - Remove listing information from colums 72+.
C              - Updated comments as part of subroutine documentation
C          procedure.
C-----------------------------------------------------------------------
      L1=L
      L2=L-1
      IF(JZ)1,2,1
1     F1=R8FDIP(E1,L1,E2,L2)
      F2=R8FDIP(E1,L2,E2,L1)
      EL=L
      DIPSUM=(F1-F2)*(F1+F2)*(1.0+EL*EL*E1)/(EL*(E1-E2))
      RETURN
2     F1=R8FDIP0(E1,L1,E2,L2,1.0D-12)
      F2=R8FDIP0(E1,L2,E2,L1,1.0D-12)
      EL=L
      DIPSUM=(F1-F2)*(F1+F2)*EL*E1/(E1-E2)
      RETURN
      END
```