ADAS Subroutine fcf4

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C
      subroutine fcf4(f,c,x0,e,z,el,x1,h)
C-----------------------------------------------------------------------
C
C  ****************** fortran77 program: fcf4.for **********************
C
C  Purpose:  Evaluates free regular Coulomb real function
C
C            Puts result in
C            f(j),j=1,2,...,x1/h.
C            f satisfies ((d/dx)(d/dx)-el(el+1)-2z/x+e)f=0
C            f=c*x**(el+1.0)*(1.0+...)   for small x
C            f=k**(-0.5)*dsin(kx-0.5*el*pi-(z/k)log(2kx)+
C            arggamma(el+1+i*z/k))  for large x
C            where k=dsqrt(e)
C            n.b. z is positive for repulsive field
C
C  Subroutine:
C
C  input : (r*8)  e        = energy (Ryd)
C  input : (r*8)  z        = effective charge seen by electron
C  input : (r*8)  el       = orbital angular momentum
C  input : (r*8)  x1       = outer limit for tabulation
C  input : (r*8)  h        = tabulation step length
C
C  output: (r*8)  f()      = resulting Coulomb function
C  output: (r*8)  c        = normalisation constant
C  output: (r*8)  x0       = the (approx) first point of inflexion in f
C
C          (r*8) wilf      = fortran function
C
C
C  Routines:
C          none
C
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C
C  Date:   24/02/03
C
C  Update: HP Summers   24/05/04 Restructure and addded standard warning
C
C  Update: AD Whiteford 20/07/07 Modified comments slightly to allow
C                                for automatic generation of
C                                documentation.
C
C-----------------------------------------------------------------------
      REAL*8              C,           E,           EL,          F(1000)
      REAL*8              H,           X0,          X1,          Z
```