ADAS Subroutine r8form

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      FUNCTION R8FORM( MXNENG , MXNSHL , N       , L      ,
     &                 IESEL  , ITYPE  , NENRGY , XLCUTA ,
     &                 PL2A   , PL3A
     &                )
C
C
C-------------------------------------------------------------------
C
C  ******************* FORTRAN77 FUNCTION: R8FORM *********************
C
C  PURPOSE:  CALCULATES CHARGE EXCHANGE L-RESOLVED CROSS-SECTION AS A
C            FRACTION OF THE CORRESPONDING N-RESOLVED CROSS-SECTION.
C
C  CALLING PROGRAM: GENERAL USE.
C
C  FUNC  : (R*8)  R8FORM     = L-RESOLVED CROSS-SECTION AS FRACTION OF
C                             N-REOSLVED CROSS-SECTION.
C  INPUT : (I*4)  MXNENG     = MAXIMUM NO. OF ENERGIES.
C  INPUT : (I*4)  MXNSHL     = MAXIMUM NO. OF N SHELLS.
C  INPUT : (I*4)  N          = PRINCIPAL QUANTUM NUMBER.
C  INPUT : (I*4)  L          = ORBITAL QUANTUM NUMBER.
C  INPUT : (I*4)  IESEL      = SELECTED ENERGY INDEX.
C  INPUT : (I*4)  ITYPE      = TYPE OF APPROXIMATION TO USE.
C                            = 1 = 2L+1 INCREASE WITH L AND EXPONENTIAL
C                                  CUTOFF AS L/LCUT.
C                            = 2 = 2L+1 INCREASE WITL L, SHARP CUTOFF AT
C                                  MIN(LCUT,N-1).
C                            = 3 = (2L+1)**2 INCREASE WITH L, SHARP
C                                  CUTOFF AT MIN(LCUT,N-1).
C                            = 4 = KRONECKER DELTA(L,MIN(LCUT,N-1)).
C                            = 5 = 2L+1 INCREASE WITH L AND EXP. CUTOFF
C                                  AS MAX(0,L-LCUT)/2.
C                            = 6 = 2L+1 INCREASE WITH L AND EXP. CUTOFF
C                                  AS 2*MAX(0,L-LCUT).
C                            = 7 = NEW PRIMARY FORM BASED ON SPFMAN13
C                                  FITTING PROCEDURE WITH SHARP SWITCHING
C                                  FUNCTIONS.
C                            = 8 = NEW PRIMARY FORM BASED ON SPFMAN13
C                                  FITTING PROCEDURE WITH SOFT SWITCHING
C                                  FUNCTIONS.
C  INPUT : (I*4)  NENRGY     = NUMBER OF ENERGIES IN DATASET.
C  INPUT : (R*8)  XLCUTA()   = PARAMETERS FOR CALCULATING L-RES X-SEC.
C                             DIMENSION: ENERGY INDEX
C  INPUT : (R*8)  PL2A()     = PARAMETERS FOR CALCULATING L-RES X-SEC.
C                             DIMENSION: ENERGY INDEX
C  INPUT : (R*8)  PL3A()     = PARAMETERS FOR CALCULATING L-RES X-SEC.
C                             DIMENSION: ENERGY INDEX
C
C  PARAM : (I*4)  MXB        = 'MXBEAM'.
C  PARAM : (I*4)  MXN        = 'MXNSHL'.
C  PARAM : (I*4)  MXTYPE     = NO. OF DIFFERENT APPROXIMATIONS.
C  PARAM : (R*8)  C1         =
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C
C          (I*4)  LCUT       = CUT OFF VALUE FOR ORBITAL QUANTUM NUMBER.
C          (I*4)  LC         = CUT OFF VALUE FOR ORBITAL QUANTUM NUMBER.
C          (I*4)  NN         = PRINCIPAL QUANTUM NUMBER LOOP INDEX.
C          (I*4)  LL         = ORBITAL QUANTUM NUMBER LOOP INDEX.
C          (I*4)  IE         = ENERGY LOOP INDEX.
C
C          (R*8)  SUM        =
C          (R*8)  XLC        = REAL VALUE = LC.
C          (R*8)  XL         = REAL VALUE = L.
C          (R*8)  XLL        = REAL VALUE = LL.
C          (R*8)  EF         =
C          (R*8)  XLCRIT     =
C          (R*8)  T          =
C          (R*8)  S1         =
C          (R*8)  S2         =
C          (R*8)  T1         =
C          (R*8)  T2         =
C
C          (R*8)  SUM1A()    = TABLE OF SUMS FOR 1ST APPROXIMATION.
C                               1ST DIMENSION: L CUTOFF
C                               2ND DIMENSION: N-SHELL
C          (R*8)  SUM5A()    = TABLE OF SUMS FOR 5TH APPROXIMATION.
C                               1ST DIMENSION: L CUTOFF
C                               2ND DIMENSION: N-SHELL
C          (R*8)  SUM6A()    = TABLE OF SUMS FOR 6TH APPROXIMATION.
C                               1ST DIMENSION: L CUTOFF
C                               2ND DIMENSION: N-SHELL
C          (R*8)  SUM7A()    = TABLE OF SUMS FOR 7TH APPROXIMATION.
C                               1ST DIMENSION: ENERGY INDEX
C                               2ND DIMENSION: N-SHELL
C          (R*8)  SUM8A()    = TABLE OF SUMS FOR 8TH APPROXIMATION.
C                               1ST DIMENSION: ENERGY INDEX
C                               2ND DIMENSION: N-SHELL
C
C          (L*4)  LFIRST()   = FLAGS IF FIRST CALL OF APPROXIMATION. ONLY
C                               USED BY APPROX. WHICH REQUIRE AN INTIAL
C                               SUM
C                             = .TRUE.  = FIRST CALL.
C                             = .FALSE. = NOT FIRST CALL.
C                               1ST DIMENSION: APPROX. TYPE INDEX
C
C ROUTINES:
C          ROUTINE    SOURCE    BRIEF DESCRIPTION
C          -------------------------------------------------------------
C          I4UNIT     ADAS      RETURN UNIT NO. FOR OUTPUT OF MESSAGES.
C
C AUTHOR:  JONATHAN NASH (TESSELLA SUPPORT SERVICES PLC)
C          K1/0/81
C          JET EXT. 5183
C
C DATE:    19/10/93
C
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C UPDATES:
C
C VERSION: 1.2 DATE: 23-06-98
C MODIFIED: RICHARD MARTIN
C - INCREASED MXE FORM 30 TO 40.
C
C----------------------------------------------------------------
C
C----------------------------------------------------------------
         INTEGER          IESEL,        ITYPE,        L,           MXNENG
         INTEGER          MXNSHL,       N,            NENRGY
         REAL*8           PL2A(MXNENG),               PL3A(MXNENG)
         REAL*8           XLCUTA(MXNENG)
```