

ADAS Subroutine c1spln

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SUBROUTINE C1SPLN(          LOSEL ,
&                          NENER , IEVAL , NPSPL ,
&                          ENERA , EOA   , EOSA   ,
&                          SIGA  , SIGOA , SIGOSA ,
&                          LERNG
&                          )
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C
C ***** FORTRAN77 SUBROUTINE: C1SPLN *****
C
C (IDENTICAL TO: B1SPLN (EXCEPT SOME VARIABLE NAMES ARE CHANGED))
C
C PURPOSE:
C   1) PERFORMS CUBIC SPLINE ON LOG(ENERGY) VERSUS LOG(X-SECTION)
C       INPUT DATA, ('ENERA' VERSUS 'SIGA' , NENER DATA PAIRS),
C       FOR A GIVEN SUB-BLOCK.
C
C   2) INTERPOLATES 'IEVAL' X-SECT. VALUES USING ABOVE SPLINES
C       AT ENERGIES READ IN FROM ISPF PANELS FOR TABULAR OUTPUT.
C       (ANY ENERGIES VALUES WHICH REQUIRED EXTRAPOLATION ARE SET
C       TO ZERO).
C       - THIS STEP ONLY TAKES PLACE IF 'LOSEL=.TRUE.' -
C
C   3) INTERPOLATES 'NPSPL' X-SECT VALUES USING ABOVE SPLINES AT
C       ENERGIES EQUI-DISTANCE ON RANGE OF LOG(ENERGIES) STORED
C       IN INPUT 'ENERA' ARRAY.
C
C CALLING PROGRAM: ADAS301
C
C SUBROUTINE:
C
C INPUT : (L*4)  LOSEL   = .TRUE.  => CALCULATE X-SECS FOR INPUT ENGYS.
C                               READ FROM ISPF PANEL.
C                               .FALSE. => - DO NOT DO THE ABOVE -
C
C INPUT : (I*4)  NENER   = INPUT DATA FILE: NO. OF VALID ENERGY/X-SECT.
C                               PAIRS READ FOR THE SUB-BLOCK BEING ASSESSED
C INPUT : (I*4)  IEVAL   = NUMBER OF ISPF ENTERED ENERGY VALUES AT
C                               WHICH INTERPOLATED X-SEC VALUES ARE REQUIRED
C                               FOR TABULAR OUTPUT.
C INPUT : (I*4)  NPSPL   = NUMBER OF SPLINE INTERPOLATED ENGY/X-SECT
C                               REQUIRED FOR GRAPHICAL DISPLAY.
C
C INPUT : (I*4)  ENERA() = INPUT DATA FILE: ENERGIES (EV/AMU)
C INPUT : (I*4)  EOA()  = ISPF PANEL ENTERED ENERGIES (EV/AMU)
C OUTPUT: (I*4)  EOSA() = 'NPSPL' ENERGIES FOR GRAPHICAL OUTPUT
C                               (EV/AMU).
C
C INPUT : (R*8)  SIGA()  = INPUT DATA FILE: SELECTED SUB-BLOCK -
C                               X-SECTION VALUES AT 'ENERA()'. (CM**2)
C OUTPUT: (I*4)  SIGOA() = SPLINE INTERPOLATED X-SEC VALUES AT 'EOA()'
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C                                     (EXTRAPOLATED VALUES = 0.0) .
C OUTPUT: (R*8)  SIGOSA()= SPLINE INTERPOLATED X-SEC VALUES AT 'EOSA()'
C
C OUTPUT: (L*4)  LERNG() = .TRUE.  => OUTPUT  SPLINE  VALUE  WAS
C                                     INTERPOLATED FOR 'DLOG(EOA())' .
C                                     .FALSE. => OUTPUT  SPLINE  VALUE  WAS
C                                     EXTRAPOLATED FOR 'DLOG(EOA())' .
C                                     (NOTE: 'YOUT()=0' AS 'IOPT < 0') .
C
C (I*4)  NIN      = PARAMETER = MAX. NO. OF INPUT ENGY/X-SEC
C                                     PAIRS MUST BE >= 'NENER'
C (I*4)  NOUT     = PARAMETER = MAX. NO. OF 'OUTPUT ENGY/X-SEC
C                                     PAIRS MUST BE >= 'IEVAL' & 'NPSPL'
C (R*8)  ZERO     = PARAMETER = EFFECTIVE ZERO (1.0D-72)
C (R*8)  ZEROL    = PARAMETER = LN(ZERO) APPROX.  = -165.7
C
C (I*4)  IARR     = ARRAY SUBSCRIPT USED FOR ENGY/X-SEC PAIRS
C (I*4)  IOPT     = DEFINES THE BOUNDARY DERIVATIVES FOR THE
C                                     SPLINE ROUTINE 'XXSPLE', SEE 'XXSPLE' .
C                                     (VALID VALUES = <0, 0, 1, 2, 3, 4)
C
C (R*8)  ESTEP    = THE SIZE OF STEP BETWEEN 'XOUT()' VALUES FOR
C                                     GRAPHICAL OUTPUT ENGY/X-SEC PAIRS TO BE
C                                     CALCULATED USING SPLINES.
C
C (L*4)  LSETX    = .TRUE.  => SET UP SPLINE PARAMETERS RELATING
C                                     TO 'XIN' AXIS.
C                                     .FALSE. => DO NOT SET UP SPLINE PARAMETERS
C                                     RELATING TO 'XIN' AXIS.
C                                     (I.E. THEY WERE SET IN A PREVIOUS
C                                     CALL )
C                                     (VALUE SET TO .FALSE. BY 'XXSPLE')
C
C (R*8)  XIN()    = LOG( 'ENERA()' )
C (R*8)  YIN()    = LOG( 'SIGA()' )
C (R*8)  XOUT()   = LOG(ENERGIES AT WHICH SPLINES REQUIRED)
C (R*8)  YOUT()   = LOG(OUTPUT SPLINE INTERPOLATED X-SEC VALUES)
C (R*8)  DF()     = SPLINE INTERPOLATED DERIVATIVES
C
C (L*4)  LDUMP()  = .TRUE.  => OUTPUT SPLINE VALUE INTRPOLATED
C                                     FOR 'YOUT()' .
C                                     .FALSE. => OUTPUT SPLINE VALUE EXTRAPOLATED
C                                     FOR 'YOUT()' .
C                                     (NOTE: USED AS A DUMMY ARGUMENT.
C                                     ALL VALUES WILL BE TRUE.)

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C NOTE:

C ROUTINES:

ROUTINE	SOURCE	BRIEF DESCRIPTION
XXSPLE	ADAS	SPLINE SUBROUTINE (EXTENDED DIAGNOSTICS)
R8FUN1	ADAS	REAL*8 FUNCTION: (X -> X)

C
C AUTHOR: PAUL E. BRIDEN (TESSELLA SUPPORT SERVICES PLC)
C K1/0/81
C JET EXT. 4569
C
C DATE: 07/02/91
C
C UPDATE: 30/11/93 - J NASH - ADAS91:
C INCREASED MAX NUMBER OF INPUT ENERGIES ('NIN') FROM 24 TO 30.
C
C UPDATE: 19/04/95 H P SUMMERS - ADDED TRAP FOR ZERO INPUTS
C

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INTEGER	IEVAL,	NENER,	NPSPL
LOGICAL	LERNG(IEVAL),		LOSEL
REAL*8	ENERA(NENER),		EOA(IEVAL)
REAL*8	EOSA(NPSPL),	SIGA(NENER),	SIGOA(IEVAL)
REAL*8	SIGOSA(NPSPL)		