

ADAS Subroutine cesgcx

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      SUBROUTINE CESGCX ( LSETX      , LPASS      , ILTYP      , IOPT      ,  
&                        NENIN      , ENIN      , SGIN      ,  
&                        LTHETA    , VREL      , XSEC      ,  
&                        )
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C  
C ***** FORTRAN77 SUBROUTINE: CESGCX *****  
C  
C VERSION: 1.0 (ADAS91)  
C  
C PURPOSE:  INTERPOLATES CROSS-SECTION DATA FROM AN INPUT VECTOR OF  
C           VALUES USING CUBIC SPLINES.  
C  
C           EXTRAPOLATES FOR RELATIVE SPEEDS OUT OF DATA RANGE  
C           ACCORDING TO VARIOUS TYPES (ILTYP).  LOGARITHMIC  
C           INTERPOLATION MAY BE USED (LPASS).  SPEED ECONOMY IS  
C           POSSIBLE FOR REPEATS WITH THE SAME SPLINE KNOTS (LSETX).  
C  
C CALLING PROGRAM:  CEEVTH  
C  
C NOTES:  
C   (1) FOR  ILTYP.EQ.0, EXTRAPOLATION IS AS FOLLOWS:  
C       XSEC = SIG0*DEXP(-ALPH0/VREL) FOR VREL<VREL(MIN)  
C       XSEC = SIG1*VREL**(-7.0)  FOR VREL> VREL(MAX),  
C       WHERE VREL(MIN), VREL(MAX) ARE THE FIRST AND LAST FROM  
C       INPUT VALUES IN DATA TABLES IN ADF24.  
C       FOR  ILTYP.NE.0, EXTRAPOLATION IS AS AS ABOVE AT THIS  
C       TIME.  
C  
C   (2) Based on sigcx.for but is a special version for ADAS314.  
C  
C SUBROUTINE:  
C  
C INPUT : (L*4)  LSETX      = .TRUE. => SPLINE NOT SET FOR THESE KNOTS  
C           .FLSE. => SPLINE NOT FOR THESE KNOTS  
C INPUT : (L*4)  LPASS      = .TRUE. => DO NOT CONVERT INTO LOG10 FOR  
C           ENERGIES AND X-SECTS. FOR SPLINE  
C           .FLSE. => CONVERT INTO LOG10 FOR  
C           ENERGIES AND X-SECTS. FOR SPLINE  
C INPUT : (I*4)  ILTYP      = TYPE FOR LOW AND HIGH ENERGY CROSS-  
C           -SECTION EXTRAPOLATION.  
C INPUT : (I*4)  IOPT       = SPLINE END POINT CURVATURE/GRADIENT OPTION  
C           1 => DDY1 = 0, DDYN = 0  
C           4 => DY1 = 0 , DDYN = 0  
C  
C INPUT : (I*4)  NENIN      = NUMBER OF ENERGIES IN INPUT DATA SET  
C INPUT : (R*8)  ENIN()     = ENERGIES (EV/AMU) IN INPUT DATA SET  
C INPUT : (R*8)  SGIN()     = INPUT X-SECTIONS (CM2) FROM INPUT DATA SET  
C           1ST.DIM: ENERGY INDEX  
C INPUT : (I*4)  LTHETA    = NUMBER OF VALUES IN VREL VECTOR  
C INPUT : (R*8)  VREL()     = RELATIVE SPEEDS FOR OUTPUT (CM S-1)  
C
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C OUTPUT: (R*8) XSEC() = OUTPUT CROSS-SECTION (CM2)
C
C (I*4) MAXENS = PARAMETER = MAX. LENGTH OF TABULAR XSECT.
C VECTOR
C (I*4) LDTHET = PARAMETER = MAX. LENGTH OF INTERNAL
C VECTORS
C (R*8) CMSAMU = PARAMETER = CONVERSION FACTOR FOR ENERGY
C (AMU) TO VELOCITY (CM S-1)
C
C (I*4) I = GENERAL INDEX
C (I*4) N = GENERAL INDEX
C (R*8) ALPH0 = LOW VELOCITY EXTRAPOLATION PARAMETER
C (R*8) EXPON = EXPONENT OF EXPONENTIAL
C (R*8) VSLOPE = HIGH VELOCITY EXTRAPOLATION PARAMETER
C (R*8) XIN() = INTERNAL SPLINE INDEPENDENT VARIABLE
C (R*8) YIN() = INTERNAL SPLINE DEPENDENT VARIABLE
C (R*8) VIN() = INTERNAL VECTOR
C (R*8) DY() = DERIVATIVES AT SPLINE KNOTS
C (R*8) XOUT() = INTERNAL OUTPUT INDEPENDENT VARIABLE
C (R*8) YOUT() = INTERNAL OUTPUT DEPENDENT VARIABLE
C (L*4) LINTRP() = .TRUE. => POINT INTERPOLATED
C = .FALSE. => POINT EXTRAPOLATED
C
C
C

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ROUTINES:

ROUTINE	SOURCE	BRIEF DESCRIPTION
XXSPLE	ADAS	INTERPOLATES USING CUBIC SPLINES
R8FUN1	ADAS	EXTERNAL FUNCTION FOR XXSPLE

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C DATE: 03/11/95
C

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C UPDATE: 11/04/96 HP SUMMERS - TRAPPED CASE OF ZERO RELATIVE SPEED
C

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C UNIX-IDL PORT: H.P.SUMMERS
C

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C VERSION: 1.1 DATE: 18-02-99
C

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C MODIFIED: Martin O'Mullane
C - Based on SIGCX.FOR
C

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C VERSION: 1.2 DATE: 17-05-07
C

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C MODIFIED: Allan Whiteford
C - Updated comments as part of subroutine documentation
C procedure.
C

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C
C INTEGER ILTYP, IOPT, LTHETA, NENIN
C LOGICAL LPASS, LSETX

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REAL*8

ENIN(NENIN), SGIN(NENIN), VREL(LTHETA)

REAL*8

XSEC(LTHETA)