

## ADAS Subroutine dxspl2

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      SUBROUTINE DXSPL2( ISWIT , LSWIT , IZ1 ,
&                      NDOUT , NTOUT ,
&                      NDIN ,
&                      IDE , ITE ,
&                      MAXD , DIN , DOUT ,
&                      DINTRP ,
&                      ATTY
&                      )
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C
C ***** FORTRAN77 SUBROUTINE: DXSPL2 *****
C
C PURPOSE: PERFORMS THE SECOND PART OF A 3 WAY SPLINE ON INPUT DATA.
C           GENERATES A TABLE OF LOG10( COEFFTS./POWERS ) COVERING
C           'ITE' TEMPERATURES AND 'MAXD' DENSITIES FOR THE ELEMENT
C           RECOMBINING ION CHARGE GIVEN BY 'IZ1'.
C
C CALLING PROGRAM: D1SPLN/D4DATA
C
C DATA:
C
C           THE SOURCE DATA ORIGINATES AS MEMBERS OF PARTITIONED
C           DATA SETS AS FOLLOWS:
C
C           1. JETUID.ACD<YR>.DATA
C           2. JETUID.SCD<YR>.DATA
C           3. JETUID.CCD<YR>.DATA
C           4. JETUID.PRB<YR>.DATA
C           5. JETUID.PRC<YR>.DATA
C           6. JETUID.PRB<YR>.DATA
C           7. JETUID.PRC<YR>.DATA
C           8. JETUID.PLT<YR>.DATA
C           9. JETUID.PLS<YR>.DATA
C           10. JETUID.MET<YR>.DATA
C
C           WHERE <YR> DENOTES TWO INTEGERS FOR THE YEAR SELECTED.
C
C           THE PARTICULAR TYPE OPENED (1-10) IS SELECTED BY 'ISWIT'
C           IT IS PASSED IN A MODIFIED FORM AFTER PROCESSING BY
C           DXSPL1.
C
C SUBROUTINE:
C
C INPUT : (I*4) ISWIT = DATA TYPE SELECTOR (1 -> 10)
C INPUT : (L*4) LSWIT = .TRUE. => IONISATION POTENTIALS PRESENT
C           .FALSE. => IONS. POTENTIALS NOT PRESENT
C INPUT : (I*4) IZ1 = OUTPUT - ELEMENT RECOMBINING ION CHARGE
C
C INPUT : (I*4) NDOUT = OUTPUT - MAXIMUM NUMBER OF DENSITIES
C INPUT : (I*4) NTOUT = OUTPUT - MAXIMUM NUMBER OF TEMPERATURES
C
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C INPUT : (I*4) NDIN = INPUT - MAXIMUM NUMBER OF DENSITIES
C
C INPUT : (I*4) IDE = INPUT - NUMBER OF REDUCED DENSITIES
C INPUT : (I*4) ITE = INPUT - NUMBER OF REDUCED TEMPERATURES
C
C INPUT : (I*4) MAXD = OUTPUT - NUMBER OF REDUCED DENSITIES
C ( <= NDOUT )
C INPUT : (R*8) DIN() = INPUT - SET OF 'IDE' REDUCED ELECTRON DENS-
C ITIES ).
C INPUT : (R*8) DOUT() = OUTPUT - SET OF 'MAXD' ELECTRON DENSITIES
C (UNITS: CM-3).
C
C OUTPUT: (L*4) DINTRP() = .TRUE. => 'ATTY(,)' VALUE FOR DENSITY
C INDEX INTERPOLATED.
C = .FALSE. => 'ATTY(,)' VALUE FOR DENSITY
C INDEX EXTRAPOLATED.
C 1ST DIMENSION: DENSITY INDEX
C
C IN/OUT: (R*8) ATTY(,) = WORKING SPACE FOR 3-WAY SPLINE ITERPOLATION
C (STORES LOG10 (INTERPOLATED VALUES))
C INPUT 'ATTY' VALUES ARE ASSIGNED TO 'YIN' &
C THEN 'YOUT' VALUES ARE ASSIGNED TO 'ATTY'.
C 1ST DIMENSION: TEMPERATURE
C 2ND DIMENSION: DENSITY
C
C (I*4) NDDIM1 = PARAMETER = MUST BE EQUAL TO OR GREATER THAN
C THE MAXIMUM NUMBER OF INPUT DENSITIES.
C (I*4) NDDIM2 = PARAMETER = MUST BE EQUAL TO OR GREATER THAN
C THE MAXIMUM NUMBER OF OUTPUT DENSITIES.
C
C (I*4) IT = ARRAY SUBSCRIPT USED FOR TEMPERATURE VALUES
C (I*4) ID = ARRAY SUBSCRIPT USED FOR DENSITY VALUES
C (I*4) IOPT = DEFINES THE BOUNDARY DERIVATIVES FOR THE
C SPLINE ROUTINE 'XXSPLE', SEE 'XXSPLE'.
C (VALID VALUES = 0, 1, 2, 3)
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) Z1R7 = 1 / (IZ1**7)
C (R*8) YIN() = 'ATTY(,)' AT FIXED TEMPERATURE -
C DIMENSION => DENSITY
C (R*8) DF() = SPLINE INTERPOLATED DERIVATIVES
C (R*8) XOUT() = 'DOUT()' VALUES CONVERTED TO REDUCED DENSITY
C (R*8) YOUT() = SPLINE INTERPOLATED 'ATTY(,,)' VALUES FOR
C REDUCED DENSITY EQUAL TO 'XOUT()' AT A
C FIXED TEMPERATURE.
C

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C NOTE:

SPLINE IS CARRIED OUT ON:  
'ATTY(,,)' VALUES AT FIXED TEMPERATURE  
VERSUS  
LOG10( REDUCED DENSITY )

C ROUTINES:

ROUTINE	SOURCE	BRIEF DESCRIPTION
XXSPLE	ADAS	SPLINE SUBROUTINE (WITH EXTRAP. INFO)

C AUTHOR: PAUL E. BRIDEN (TESSELLA SUPPORT SERVICES PLC)  
K1/0/37  
JET EXT. 2520

C DATE : 13/06/91 - PE BRIDEN: ADAS91 VERSION OF 'D4SPL2'

C UPDATE: 07/08/91 - PE BRIDEN: CHANGED THE LINE -  
Z1R7 = 1.0 / DBLE(IZ1\*\*7)  
TO -  
Z1R7 = 1.0 / DBLE(IZ1)\*\*7  
TO AVOID INTEGER OVERFLOW WHEN IZ1>21

C UNIX-IDL PORT:

C VERSION: 1.1 DATE: 06-09-95  
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)  
- FIRST RELEASE

C VERSION: 1.2 DATE: 25-10-97  
C MODIFIED: LORNE HORTON (JET)  
- FORCED ZERO LOW DENSITY DEPENDENCE

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INTEGER	IDE,	ISWIT,	ITE,	IZ1
INTEGER	MAXD,	NDIN,	NDOUT,	NTOUT
LOGICAL	DINTRP (NDOUT),		LSWIT	
REAL*8	ATTY (NTOUT,NDOUT),		DIN (NDIN)	
REAL*8	DOUT (NDOUT)			