ADAS Subroutine bgtran

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C

      SUBROUTINE  BGTRAN( TYP   , C       ,
     &                    AIN   , WVNOU   , WVNOL , WTU   , WTL   ,
     &                    TEIN  , UPSIN   , NV    ,
     &                    x     , y
     &                  )


C-----------------------------------------------------------------------
C
C  ***************** FORTRAN77 SUBROUTINE: BGTRAN ********************
C
C This subroutine is based on ADAS215's bftran.for - it is modified to
C output the Burgess and Tully x and y vectors.
C
C PURPOSE : TO IMPLEMENT THE TRANSFORMATION DESCRIBED BY
C           BURGESS AND TULLY ( SEE REFERENCE (1)) WHICH
C           IS USED TO ASSESS AND COMPACT DATA.
C
C
C REFERENCES:
C           (1) A.BURGESS AND J.A.TULLY
C           ON THE ANALYSIS OF COLLISION STRENGTHS
C           AND RATE COEFFICIENTS.
C           ASTRON.ASTROPHYS.254,436-453 (1992 )
C
C           (2) SUMMERS.H.P
C               ADAS USERS MANUAL ( 1ST EDITION ).
C
C INPUT :
C       (R*8) Z1          = THE ION CHARGE +1.
C       (C*1) TYP         = BURGESS & TULLY TRANSITION TYPE CODE
C       (R*8) C           = THE ADJUSTABLE PARAMETER ASSOCIATED
C                           WITH THE BURGESS AND TULLY
C                           TRANSFORMATION ( SEE REFERENCE (1)).
C       (R*8) AIN         = THE EINSTEIN 'A' CO-EFFICIENT. THIS
C                           IS READ DIRECTLY FROM THE ADF04
C                           TYPE FILE.
C       (R*8) WVNOU       = THE WAVENUMBER OF THE UPPER LEVEL.
C                           THIS IS READ DIRECTLY FROM THE ADF04
C                           TYPE FILE.
C       (R*8) WVNLO       = THE WAVENUMBER OF THE LOWER LEVEL.
C                           THIS IS READ DIRECTLY FROM THE ADF04
C                           TYPE FILE.
C       (R*8) WTU         = THE STATISTICAL WEIGHT OF THE UPPER
C                           LEVEL. THIS IS OBTAINED BY
C
C       (R*8) WTL         = THE STATISTICAL WEIGHT OF THE LOWER
C                           LEVEL. THIS IS OBTAINED BY
C
C       (R*8) TEIN        = THE TEMPERATURE ARRAY (K). THIS
C                           DATA IS READ DIRECTLY FROM THE
C                           ADF04 TYPE FILE.
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C        (R*8) UPSIN        = THE ARRAY CONTAING THE EFFECTIVE
C                             COLLISION STRENGTH. THIS DATA IS
C                             READ DIRECTLY FROM THE ADF04
C                             TYPE FILE.
C        (I*4) NV           = THE NUMBER OF TEMPERATURE/EFFECTIVE
C                             COLLISION STRENGTH PAIRS FOR A GIVEN
C                             TRANSITION.
C
C OUTPUT:
C
C        (R*8) X            = THE X ARRAY ASSOCIATED WITH THE
C                             BURGESS AND TULLY TRANSFORMATION.
C        (R*8) Y            = THE Y ARRAY ASSOCIATED WITH THE
C                             BURGESS AND TULLY TRANSFORMATION.
C
C
C        (R*8) E            = THE MATHEMATICAL CONSTANT E.
C        (R*8) CONST        = CLUSTER OF PHYSICAL CONSTANTS.
C                             SEE PAGE 12 OF REFERENCE (2).
C        (R*8) EIJIN        = THE TRANSITION ENERGY (RYD).
C        (R*8) FIJIN        = THE OSCILLATOR STRENGTH.
C        (R*8) ET           = GENERAL CONSTANT.
C        (R*8) C            = THE BURGESS C PARAMETER.
C        (R*8) DY           = DERIVATIVES AT INPUT KNOTS.
C                             SEE XXSPLN FOR FUTHER DETAILS.
C        (R*8) XOUT         = X ARRAY ASSOCIATED WITH THE
C                             BURGESS AND TULLY TRANSFORMATION.
C        (R*8) YOUT         = Y ARRAY ASSOCIATED WITH THE
C                             BURGESS AND TULLY TRANSFORMATION.
C        (I*4) NVMAX        = THE MAXIMUM NUMBER OF TEMPERTURES
C                             THAT CAN BE READ.
C        (I*4) IOPT         = GENERAL PARAMETER ASSOCIATED WITH
C                             THE SUBROUTINE XXSPLN.
C        (I*4) I            = GENERAL VARIABLE WHICH IS USED AS
C                             A COUNTER.
C        (LOG) LSETX        = PARAMETER ASSOCIATED WITH THE
C                             SUBROUTINE XXSPLN.
C
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C          JA8.08
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C
C DATE:   04/06/98
C
C
C VERSION : 1.1                          DATE: 17/03/1999
C MODIFIED : MARTIN O'MULLANE
C          FIRST VERSION.
C
C-----------------------------------------------------------------
      CHARACTER        TYP
      INTEGER          NV
      REAL*8           AIN,        C,          TEIN(NV)
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REAL*8              UPSIN(NV),    WTL,          WTU,          WVNOL
REAL*8              WVNOU,        X(NVMAX),     Y(NVMAX)
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