**f \_ v a l u e s**

|  |  |
| --- | --- |
| Description: | calculation of f-values for transition between target states based on the asymptotic coefficients in the H.DAT file |
| Input files: | **H.DAT** or **h.nnn, target** |
| Output files: | **f\_values** or **f\_values.nnn** |
| Call as: | **f\_values**  [**h**=… **klsp**=…]  h [H.DAT] – alternative name for input file  klsp [1] - partial wave index to choose **h.nnn** file for the process |

**s \_ v a l u e s**

|  |  |
| --- | --- |
| Description: | calculation of s-values for transition between target states based on the asymptotic coefficients in the H.DAT file |
| Input files: | **H.DAT** or **h.nnn, target** |
| Output files: | **s\_values** or **s\_values.nnn** |
| Call as: | **s\_values** [**h**=.. **klsp1**=… **klsp2**=… **L1**=… **L2**=...]  h [H.DAT] - alternative name for H.DAT file  klsp1[0] - |

|  |  |
| --- | --- |
| h [H.DAT] | alternative name for H.DAT file |
| klsp1[0] | minimum index of partial wave to be considered |
| klsp2[0] | maximum index of partial wave to be considered |
| L1[-1] | minimum total orbital moment to be considered |
| L2[-1] | maximum total orbital moment to be considered |
|  |  |

**Asymptotic coefficients decomposition**

**LS coupling**

The long-range potential coefficients coupling two channels are

 (1)

In tensor notation

 (2)

where

 (3)

and

 . (4)

To evaluate expression (2), we may use the general expression (see, e.g., Cowan 1981, Eq.11.47) for matrix elements of a scalar product when angular momenta *j*1, *j*2 correspond to different subsystems

 (5)

Then coefficients (2) are reduced to

 (6)

This expression can be used for determination radiative matrix elements for transitions between target states from the asymptotic coefficients in *LS* coupling case.

**jj coupling**

 (7)

Here we can use the uncoupling formula when operator operates only within the first subspace (see Cowam 1981, Eq.11.38):

 (8)

Then

 (9)

**jK coupling**

 (10)

First we should uncoupled the *J*1 and *J*2 by transferring to *jj*-coupling (Cowan 1981, Eq.9.25):

 (11)

Then

 (12)

Now let reduce sum over *j*1, using the sum rule (Cowan 1981, Eq. 5.33):

 (13)

where S = *j*1 + *j*2 + *j*3 + *l*1 + *l*2 + *l*3 + *l'*1 + *l'*2 + *l'*3. Then

 (14)

Using the orthogonal relation (Cowan 1981, Eq.5.31)

 (15)

finally obtain

 (16)