Brookhaven National Laboratory

U.S. DEPARTMENT OF ENERGY

MR #141

David Brown

National Nuclear Data Center

25 April 2023

@BrookhavenLab

From Andrej

I noticed a trivial error in section 4.2.1. of the ENDF manual. The last parameter in the CONT record should be “NM”

This is analogous to the CONT record in Section 4.2.4. Since this is a trivial type, I suppose it is enough to report to CSEWG but does not require formal approval.

Cheers, Andrej

This is NM as specified in current manual

MF=6, LANG=0, LAW=2
MF=14 LI=0, LTT=2
MF=26, LAW=2

Each has a max Legendre order in the format specifications

LTT Flag to specify the representation used and it may have the following values:
LTT=0, all angular distributions are isotropic
LTT=l, the data are given as Legendre expansion coefficients, $a_l(E)$
LTT=2, the data are given as tabulated probability distributions, $f(\mu, E)$
LTT=3, low energy region is represented by as Legendre coefficients; higher region is represented by tabulated data.

LI Flag to specify whether all the angular distributions are isotropic
LI=0, not all isotropic
LI=1, all isotropic

LCT Flag to specify the frame of reference used
LCT=l, the data are given in the LAB system
LCT=2, the data are given in the CM system

NE Number of incident energy points at which angular distributions are given (See Appendix G for the limit on NE).

NL Highest order Legendre polynomial that is given at each energy (NL $\leq$ NM)

NM Maximum order Legendre polynomial that is required to describe the angular distributions in either the center-of-mass or the laboratory system. NM should be an even number. See Appendix G for the limit on NM.

NP Number of angular points (cosines) used to give the tabulated probability distributions for each energy (See Appendix G for the limit on NP).

Before

4.2.1 Legendre Polynomial Coefficients (LTT=1, LI=0)

When LTT=1 (angular distributions given in terms of Legendre polynomial coefficients), the structure of the section is:

[MAT, 4, MT/ ZA, AWR, 0, LTT, 0, 0]HEAD (LTT=1)
[MAT, 4, MT/ 0.0, AWR, LI, LCT, 0, 0]CONT (LI=0)
[MAT, 4, MT/ 0.0, 0.0, 0, 0, NR, NE/ E_{int}]TAB2
[MAT, 4, MT/ T, E_1, LT, 0, NL, 0/ $a_l(E_1)$]LIST
[MAT, 4, MT/ T, E_2, LT, 0, NL, 0/ $a_l(E_2)$]LIST

[MAT, 4, MT/ T,E_{NE}, LT, 0, NL, 0/ $a_l(E_{NE})$]LIST
[MAT, 4, 0/ 0.0, 0.0, 0, 0, 0, 0]SEND

Each energy already has an NL, so NM would be the max of all energies

Note that T and LT refer to temperature (in K) and a test for temperature dependence, respectively. These values are normally zero, however.

After

subsection is:

[MAT, 4, MT/ ZA, AWR, 0, LTT, 0, 0]HEAD (LTT=3)
[MAT, 4, MT/ 0.0, AWR, LI, LCT, 0, NM]CONT (LI=0)
(Legendre coefficients)
[MAT, 4, MT/ 0.0, 0.0, 0, 0, NR, NE1/ E_{int}]TAB2
[MAT, 4, MT/ T, E_1, LT, 0, NL, 0/ $a_l(E_1)$]LIST

[MAT, 4, MT/ T,E_{NE1}, LT, 0, NL, 0/ $a_l(E_{NE1})$]LIST
(Tabulated data)
[MAT, 4, MT/ 0.0, 0.0, 0, 0, NR, NE2/ E_{int}]TAB2
[MAT, 4, MT/ T,E_{NE1}, LT, 0, NR, NP/ μ_{int} / $f(\mu, E_{NE1})$]TAB1

[MAT, 4, MT/ T,E_{NET}, LT, 0, NR, NP/ μ_{int} / $f(\mu, E_{NET})$]TAB1
(NET = NE1+NE2-1)
[MAT, 4, 0/ 0.0, 0.0, 0, 0, 0, 0]SEND

Big win: can allocate memory before reading

Note that there is a double energy point at the boundary E_{NE1}, which appears as the last point in the Legendre expansion tables and the first point in the tabulated distribution tables.

Brookhaven National Laboratory