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Overview of FRENDY version 2/FRENDY 第二版の概要

Nuclear data processing has an important role to connect evaluated nuclear data libraries and neutronics calculation codes. JAEA has developed the nuclear data processing code FRRENDY since 2013 to generate a cross section file from an evaluated nuclear data file with a simple input file. FRENDY version 1 was released in 2019 [1]. It only generates an ACE formatted cross section file for the continuous energy Monte Carlo calculation codes such as PHITS, MCNP, Serpent, and OpenMC. After we released FRENDY version 1, many functions were implemented such as multi-group cross section file generation function [2], adaptive setting of background cross section [3], ACE file perturbation [4], statistical uncertainty quantification of probability table [5], and modification of ENDF-6 formatted files. We released FRENDY version 2 including these new functions in 2022 [6]. This presentation explains the overview of FRENDY version 2 and the newly implemented functions in this code.

FRENDY is an open-source software under 2-clause BSD license. Everyone can freely use FRENDY and implement the modules of FRENDY in their code without any restriction. It can be downloaded from the JAEA website [7].

FRENDY can treat two input formats. One is the FRENDY's original input format. It is very simple and it does not require expert knowledge of nuclear data processing. For example, FRENDY can generate a cross section file with an evaluated nuclear data file name and processing mode. The other is the NJOY compatible input format. The available NJOY input is MODER, RECONR, BROADR, PURR, UNRESR, THERMR, ACER, GROUPR, and MATXSR.

FRENDY version 2 has original functions to generate a multi-group cross section file, e.g., explicit consideration of the resonance interference effect of the compound of different isotopes such as UO2, automatic background cross section set with the minimum number of background cross section, and resonance upscattering correction [8]. These functions are only available for the FRENDY's original input format. The sample input to use these functions are found in the manual of FRENDY [6]. These functions will improve the prediction accuracy of the multi-group neutronics calculation code.

We are now developing the heat production cross section calculation function, multi-group covariance matrices function, and treatment of the GNDS format. FRENDY version 3 will be released including these functions in the future.

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