Consultancy Meeting on GNDS/FUDGE/TAGNDS

Report of Contributions

Contribution ID: **1**   Type: **not specified**

Handling of GNDS in FRENDY and our recent activity

Wednesday, May 24, 2023 2:55 PM (1 hour)

This presentation explains the handling of the GNDS format in the nuclear data processing code FRENDY. The purpose of this meeting is not only the handling of the GNDS format but also the high-fidelity multi-physics simulation efforts. We also present the overview of the high-fidelity multi-physics simulation platform JAMPAN.

Author: TADA, Kenichi (Japan Atomic Energy Agency)

Presenter: TADA, Kenichi (Japan Atomic Energy Agency)

Contribution ID: **2**   Type: **not specified**

YANDF: An attempt to unify TALYS, EXFOR and ENDF data formats

Monday, May 22, 2023 3:30 PM (1 hour)

There are 3 sources of nuclear reaction data:

- Experimental data, as compiled in the EXFOR database

- Theoretical data: nuclear model code output, with TALYS as a prime example

- Evaluated nuclear data: as present in ENDF or GNDS nuclear data libraries, and underlying data libraries such as EGAF, RIPL etc.

The output of TALYS was already rather systematic in terms of data files and meta data, and at least two codes, TEFAL and TAGNDS, successfully transform the TALYS output into nuclear data libraries. However, a higher degree of automation in the nuclear data pipeline and AI/ML applications require that consistent serialization of the TALYS output is taken a step further. Therefore, Yet Another Nuclear Data Format (YANDF) is presented here, primarily to provide a consistent schema for TALYS output enabling easy processing. In addition, starting from the fundamental definition of a nuclear reaction, the same schema can be used to provide the metadata for EXFOR and ENDF data. The resulting keyword-driven data files are not as non-descriptive as ENDF and not as heavy as EXFOR or GNDS, and should be an easy starting point for direct use, especially to numerically compare or plot data, or for parsing into GNDS, JSON, ENDF or other formats.

Author: KONING, Arjan (IAEA)

Presenter: KONING, Arjan (IAEA)

Contribution ID: **3**   Type: **not specified**

TAGNDS and Autotalys update

Tuesday, May 23, 2023 10:00 AM (1 hour)

TAGNDS reads the output of TALYS to directly produce a GNDS-formatted evaluation. The code depends on GNDS support in the LLNL code FUDGE, reading TALYS outputs into FUDGE classes that are then serialized to GNDS/xml files. TAGNDS has recently been modified and scaled up to integrate into the autotalys framework, with the goal of helping to produce the next version of the TENDL library directly in GNDS. This presentation will provide an overview of the current status and remaining issues with TAGNDS in autotalys.

Author: MATTOON, Caleb (Lawrence Livermore National Laboratory)

Presenter: MATTOON, Caleb (Lawrence Livermore National Laboratory)

Contribution ID: **4**   Type: **not specified**

Developing a Web Service for EXFOR Using RESTful API and JSON Schema

Monday, May 22, 2023 2:00 PM (1 hour)

The Experimental Nuclear Reaction Database (EXFOR) is a collection of numerical data compiled by an international collaboration within the Nuclear Reaction Data Centre (NRDC). Despite the data being digitized and widely used, the 80-column fixed width format with line numbers in every line, which originates from punch card legacy, is still in use. This format restricts users from using EXFOR data directly with plotting packages or modern AI/ML tools, such as developing outlier detection, substantially undermining the applications of modern techniques.

As an initial attempt, we are developing the EXFOR parser to convert EXFOR data to JSON and providing data via REST APIs and a new interface. Our developments incorporate the preservation of the EXFOR master files, a Python parser to convert EXFOR and EXFOR dictionary to JSON, a RIPL3 discrete level parser, a decay data parser, a FLASK-based RESTful API, and a Dataexplorer[1] interface developed in the Dash/Plotly framework. The Git service, Github repository of IAEA-NDS[2], tracks modifications, updates, and deletions of EXFOR master files, converted JSON files, parser and plotting module programs.

In this presentation, we will provide an overview and examples of our developments, which might be useful for storing EXFOR data in GNDS format or using EXFOR data in modern mechanisms.

[1] https://nds.iaea.org/dataexplorer/
[2] https://github.com/IAEA-NDS/

Author: Dr OKUMURA, Shin (IAEA)

Presenter: Dr OKUMURA, Shin (IAEA)

Contribution ID: **5** Type: **not specified**

GNDS/FUDGE/TAGNDS white paper

Monday, May 22, 2023 11:00 AM (1 hour)

The purpose of the event is to assess the actual capabilities, successfully deployed methods, tools and protocols, and future needs in terms of nuclear model code outputs in the General Nuclear Data Structure and their processing into useful applications forms. At the same time and in support of high-fidelity multi-physics simulation efforts, build a modern durable partnership between fundamental sciences and applications needs.

Author: Dr SUBLET, Jean-Christophe (IAEA)

Presenter: Dr SUBLET, Jean-Christophe (IAEA)

Contribution ID: **7**   Type: **not specified**

The FUDGE translation of the TENDL-2021 library from ENDF-6 to GNDS

Tuesday, May 23, 2023 3:30 PM (1 hour)

The conversion of TENDL libraries from ENDF-6 to GNDS is an indirect approach to making the output from the TALYS nuclear model code system available in the new Generalized Nuclear Data Structure (GNDS) format. The LLNL processing code FUDGE, was used to translate TENDL-2021 from ENDF-6 to GNDS. An overview of this work is provided and the different warning and error messages are discussed.

Author: GERT, Godfree (Lawrence Livermore National Laboratory)

Presenter: GERT, Godfree (Lawrence Livermore National Laboratory)

Contribution ID: **8**   Type: **not specified**

NJOY modernisation and GNDS support in scion

Wednesday, May 24, 2023 10:00 AM (1 hour)

The NJOY modernisation strategy in which the required format components (for ENDF and ACE) were developed first is moving to the next stage in which development of processing components has started. The first among there is scion, modern NJOY's component for the interpretation, linearisation, integration and differentiation. The current state of this new component already allows us to perform some diagnostics on the methods used in NJOY2016 for the processing of ACE files.

In addition, to providing the basic operations that will be used in various processing modules, scion will also provide a format agnostic data interface capable of reading in and writing out data from various evaluated nuclear data format including ENDF and GNDS.

https://github.com/njoy/scion
https://github.com/njoy/scion/blob/feature/examples-1/python/examples/h1-elastic-angular-distribution.ipynb
https://github.com/njoy/scion/blob/feature/examples-1/python/examples/h1-capture-linearisation.ipynb

Author: HAECK, Wim (LANL)

Presenter: HAECK, Wim (LANL)

Contribution ID: **9** Type: **not specified**

LLNL's FUDGE and GIDI+ Code Packages

Tuesday, May 23, 2023 2:00 PM (1 hour)

LLNL's FUDGE and GIDI+ Code Packages: for Managing, Processing and Accessing GNDS 2.0 Nuclear Data Libraries

Author: BECK, Bret (LLNL)

Presenter: BECK, Bret (LLNL)