SG49: Reproducibility in Nuclear Data Evaluation

M. Herman and D. Rochman

- Reminder:
  - Goals
  - Assumptions & needs
  - What it is about & steps
- Lessons learned from the previous meeting

Reminder: Goals

- Goals:
  - “automated and information-driven evaluation” system
  - Taking advantage of the existing knowledge (experimental, theoretical and human)
  - To fit in a global frame of “fully remote” activity

- To be avoided in this SG activities, discussions on
  - Physics
  - Mathematics
  - Method developments
  - Cross section calculation

Reminder: Assumptions & needs

- Assumptions:
  - A "*system*" for nuclear data evaluation exists (can be improved, modified, changed, but it is already there)
  - Users exist
  - Developers exist

  - Needs for computer support, traceability
  - Knowledge "preservation" (not re-inventing the wheel for every library release)
  - Documentation
  - Eventually part of a large system: Evaluation + Validation + Optimization (e.g. NEA DB)

Reminder: What it is about & steps

1. Implementation of codes, portability, QA

   – Is it portable
   – Who can use it
   – How
   – Under which system

2. Not losing information + using knowledge in a more efficient way

   – What to keep (EXFOR, input files…)
   – Why (knowing what's inside and what it does)
   – How (structure towards portability, easy to read…)

3. Application, example
   – How far can we go
   – Example of such system
   – Tests

Lessons learned from the previous meeting

Some observations:

1. Evaluation: 90% performed by a code
2. Evaluation: 90% adjusting models/parameters/formatting
3. EMPIRE, TALYS/T6: a large part is not source (database)
4. Other codes (resonance range, light elements): 90% of specialists not there anymore
5. EXFOR: optimistically 90% good data
6. ICSBEP: optimistically 90% good data

Some identified issues:

7. How to define a quality flag for a library ? (completeness, performance, processability, reporting…)
8. Relevance of evaluation: which parts of the ENDF files are of prime importance ?
9. Quantities of interest: not quantified yet
10. Open-source issues, export control, remote execution issues

Lessons learned from the previous meeting

Part of the solution:

11. Move to Docker, Gitlab (example at the last and present meetings),
12. Separation of codes and database (RIPL, ”libraries” for T6)
13. Derive from EXFOR a database with quality flag (and possibly a new format)
14. Necessity to define a validation scheme
15. Define Quantity of Interest
16. Use a unique code for a unique library ?

For this meeting

For this meeting:

- Learn more about existing evaluation systems (TALYS, EMPIRE)
- Learn more about the NEA validation environment
- Update on EXFOR
- Other points of discussions ?
  - (other codes, other issues)