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M. Hursin (PSI)

Compilation of the past methodological presentations

WPEC/SG46, December 17th, 2021 (WebEx Meeting)

Methodology report

- SG46 mandate states that a methodology should be formalized addressing the following points:
  1. Selecting appropriate experiments (focus on separate effects).
  2. Analyzing C/E by isotope, reaction, and energy range in order to point out compensation effects.
  3. Computing sensitivity coefficients of selected experiments and integral parameters.
  4. Performing new generalized adjustments to provide unambiguous feedbacks.
  5. Use of covariance data for angular distributions, secondary energy distribution from inelastic scattering.

- In May 2021, we decided to tackle this part of the mandate by releasing a report summarizing the methodological developments presented far
  - A (small) text per presentation, summarizing the main outcomes. When multiple presentations on the same topic, unique contribution is welcome
  - Next slides describe by meeting the relevant presentations.
  - All points are covered somehow but very limited amount of presentations have been “documented” so far.

Fall 2017

- "Availability and use of sensitivity coefficients data bases" (I. Hill, NEA)
  - Relevant to #3
  - short summary expected
- "'Tiny' adjustment of nuclear data and associated correlation factor" (K. Yokoyama, JAEA)
  - Relevant to #4
  - short summary expected
- "Criteria and practice for selection and setting up of new experiments" (E. Ivanov, IRSN)
  - Relevant to #1
  - short summary expected
- "A new potential tool: the continuous energy adjustment method" (M. Aufiero, UC Berkeley & G. Palmiotti, INL)
  - Relevant to #3,4
  - short summary expected
- "Discussion on how to select integral benchmarks in nuclear data adjustment" (H. Wu, CNDC)
  - Relevant to #1
  - short summary expected

Spring 2018

- "Summary of the recommendation by the IAEA Consultants Meeting on Integral Data in Nuclear Data Evaluation"(K. Yokoyama, JAEA)
  - Relevant to #4
  - short summary expected
- "Examples of SINBAD shielding benchmarks suitable for ND validation"(I. Kodeli, JSI)
  - Relevant to #1
  - short summary expected
- "Testing Calibration Effects with SG33 Benchmarks" / "Design of the exercises to combine use trend analysis and reference group method in isotope oriented adjustment" (H. Wu, CNDC)
  - Relevant to #3,4
  - short summary expected
- "Comparing GLLS with Stochastic Sampling Based Data Assimilation" (D. Siefman, EPFL)
  - Relevant to #3
  - **short summary provided**
- "Preliminary Adjustment Using CIELO Isotopes and Their Associated Covariance Matrices" / "Preliminary Feedback on Using CIELO Covariance Matrices" (G. Palmiotti, INL)
  - Relevant to #2
  - short summary expected
- "TMC adjustment of nuclear data libraries using integral benchmarks" (H. Sjöstrand, UU)
  - Relevant to #4
  - short summary expected
- "Recent Updates to the Nuclear Data Sensitivity Tool (NDNaST)" (L. Fiorito, NEA)
  - Relevant to #5
  - short summary expected

Fall 2018

- Treating inconsistent data in Monte Carlo integral adjustment using Marginalized Likelihood Optimization (Henrik SJÖSTRAND, Sweden)
  - Relevant to #4
  - short summary expected

- Example of a Bayesian Monte Carlo (BMC) Technique applied for 235U adjustment using Criticality and Transmission Integral Benchmarks (Oscar CABELLOS DE FRANCISCO, Spain)
  - Relevant to #4
  - short summary expected

- Continuous energy sensitivities with CONRAD/TRIPOLI-4 (Cyrille DE SAINT JEAN, France)
  - Relevant to #3
  - short summary expected

- Performance assessment of adjusted nuclear data along with their covariances on the basis of fast reactor experiments / Recent developments and enhancements of the APIA methodology (Sandro PELLONI, Switzerland)
  - Relevant to #4
  - **short summary provided**

- On Using Statistically-Uncertain Sensitivities from Monte Carlo Codes in GLLS (Daniel SIEFMAN, Switzerland)
  - Relevant to #3
  - **short summary provided**

Spring 2019

- Trends on major actinides from an integral data assimulation, G. Rimpault (CEA)
  - Relevant to #2
  - short summary expected
- Another Use of Integral Experiments for Nuclear Data Validation: Bias Factor Methods, G. Palmiotti (INL)
  - Relevant to #4
  - short summary expected
- A new paradigm for future evaluations, M. Herman (LANL)
  - Relevant to #4
  - short summary expected
- Treating inconsistent data in integral adjustment using Marginalized Likelihood Optimization, H. Sjöstrand (UU)
  - Relevant to #4
  - short summary expected
- Adjusting GEF Model Parameters with Post Irradiation Examination Experiments, M. Hursin (PSI) and D. Siefman (PSI)
  - Relevant to #4
  - **short summary provided**

Fall 2019

- Development and Application of Data Assimilation Methods in Reactor Physics / Application of Marginal Likelihood Optimization to Haicheng's Stress Test, M. Hursin (PSI)
  - Relevant to #4
  - **short summary provided**

- Nuclear data for Beff sensitivity-uncertainty analysis, I. Kodeli (JSI)
  - Relevant to #1
  - short summary expected

- Update on Bias Factor Methods for Nuclear Data Validation, G. Palmiotti (INL)
  - Relevant to #4
  - short summary expected

- Summary of Derivations and Equivalence between Various Bias Factor Methods and Adjustment Methods, K. Yokoyama (JAEA)
  - Relevant to #4
  - short summary expected

- On the combined use of differential and integral experiments in Bayesian optimization of nuclear data, E. Alhassan (PSI)
  - Relevant to #4
  - short summary expected

Fall 2020

- WPEC SG47 SINBAD: Possible synergies with SG46, I. Kodeli (UKAEA)
  - Relevant to #1
  - short summary expected

- Constrained Bayesian Optimization of Criticality Experiments, D. Siefman (LLNL)
  - Relevant to #4
  - short summary expected

- Using Machine Learning Algorithms for Large-scale Nuclear-data Validation, D. Neudecker (LANL)
  - Relevant to #4
  - short summary expected

Spring 2021

- Summary, state-of-the-art review, step towards science-driven V&UQ, E. Ivanov (IRSN)
  - Relevant to #4
  - short summary expected

- Pulsed Neutron Die Away Experiments at Lawrence Livermore National Laboratory, D. Siefman (LLNL)
  - Relevant to #1
  - short summary expected

Conclusion

- I will circulate early next year a template document with placeholder for each contribution
- I will send it to the people who's name is made the presentations listed above
- Please send back before the Spring 2022 meeting with modifications in track mode

Thank you for your attention !