A Genetic Algorithm for Neutron Energy Spectrum Adjustment

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Abstract:

A new method for neutron energy spectrum adjustment which uses a genetic algorithm to minimize the difference between calculated and measured reaction probabilities. The measured reaction probabilities are found using neutron activation analysis. The method adjusts a trial spectrum provided by the user which is typically calculated using a neutron transport code such as MCNP. Observed benefits of this method over currently existing methods include the reduction in unrealistic artefacts in the spectral shape as well as a reduced sensitivity to increases in the energy resolution of the derived spectrum.

Bio:

Danielle Redhouse is currently a research & development Nuclear Engineer with the Applied Nuclear Technologies organization at Sandia National Laboratories (SNL). In the summer of 2012, she began her career at SNL as an undergraduate student intern, initially in Safeguards & Technical Systems, before working in the Nuclear Waste & Materials Management group for the next four years. During this internship, she did extensive dosimetry and nuclide tracking for the Radiological Materials De-Inventory campaign plan that resulted in the Department of Energy Secretary's Achievement Award in September 2016. Upon the completion of her bachelor of science in nuclear engineering degree from the University of New Mexico in 2015, she was nominated for the SNL Master's Fellowship. She earned her master of science in nuclear engineering from Texas A&M University in 2017. Current research includes software development, optimization and uncertainty methods, and computational/experimental dosimetry.