

Brief Look at FREYA and CGMF Fission Event Simulators on the K Eigenvalue

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Abstract:

MCNP is used to model reactors and can be used in a variety of scenarios. With the introduction of fission event simulators FREYA, from Lawrence Livermore, and CGMF, from Los Alamos, into MCNP; the goal of allowing MCNP to simulate situations where few fission events occur is improving. MCNP 6.2 allows the option for both of these codes to be used but, will these results produce the same K Eigenvalue. Both of these codes take into account a lot of physics and emit neutrons in a particular order based on these models. For each neutron emitted there is a separate chi energy spectrum, which when summed, averages out to the known chi spectrum. The goal is to look at how the change in average fission multiplicity and prompt fission neutron spectra would change the K Eigenvalue. The average fission multiplicity was also compared to those in the ENDF file and was found to be the same within statistical errors. Thus the change to the K Eigenvalue was negligible. Current work to implement the prompt fission neutron spectrum into an ACE file to determine the change to the K Eigenvalue.