

ABSTRACTS FOR INVITED

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P03

MODELLING NUCLEAR PROCESSES USING SIMULINK

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ABSTRACT

Simulation and modelling are essential parts in the study of dynamic system behaviour. In nuclear engineering, simulation and modelling are important to assess the expected result of an experiment before the actual experiment is conducted or in the design of nuclear facilities. In education, modelling can give insight into the dynamics of systems and processes. Most nuclear processes can be described by ordinary or partial differential equations. Efforts expended to solve the equations using analytical or numerical solution consume time and distract attention from the objective of modelling itself. This paper presents the use of Simulink, a Matlab toolbox software that is widely used in control engineering, as a modelling platform for the study of nuclear processes including nuclear reactor behaviour. Starting from the describing equations, Simulink models for heat transfer, radionuclide decay process, delayed neutron fractions, reactor point kinetic equation with six-delayed neutron group, and the effect of temperature feedback are used as examples.

Keywords: *nuclear processes, point kinetic equation, Simulink, Matlab, modelling.*