

DEVELOPMENT OF AN ADVANCED CODE SYSTEM FOR FAST-REACTOR TRANSIENT ANALYSIS

Konstantin Mikityuk¹, Sandro Pelloni, Paul Coddington
Laboratory for Reactor Physics and Systems Behaviour
Paul Scherrer Institute, 5232 Villigen PSI, Switzerland
Phone: +41 (056) 310 23 85, Fax: +41 (056) 310 23 27, E-Mail: konstantin.mikityuk@psi.ch

ABSTRACT

FAST (Fast-spectrum Advanced Systems for power production and resource management) is a recently approved PSI activity in the area of fast spectrum core and safety analysis with emphasis on generic developments and Generation IV systems. In frames of the FAST project we will study both statics and transients core physics, reactor system behaviour and safety; related international experiments. The main current goal of the project is to develop unique analytical and code capability for core and safety analysis of critical (and sub-critical) fast spectrum systems with an initial emphasis on a gas cooled fast reactors. A structure of the code system is shown on Fig. 1. The main components of the FAST code system are 1) ERANOS code for preparation of basic x-sections and their partial derivatives; 2) PARCS transient nodal-method multi-group neutron diffusion code for simulation of spatial (3D) neutron kinetics in hexagonal and square geometries; 3) TRAC/AAA code for system thermal hydraulics; 4) FRED transient model for fuel thermal-mechanical behaviour; 5) PVM system as an interface between separate parts of the code system. The paper presents a structure of the code system (Fig. 1), organization of interfaces and data exchanges between main parts of the code system, examples of verification and application of separate codes and the system as a whole.

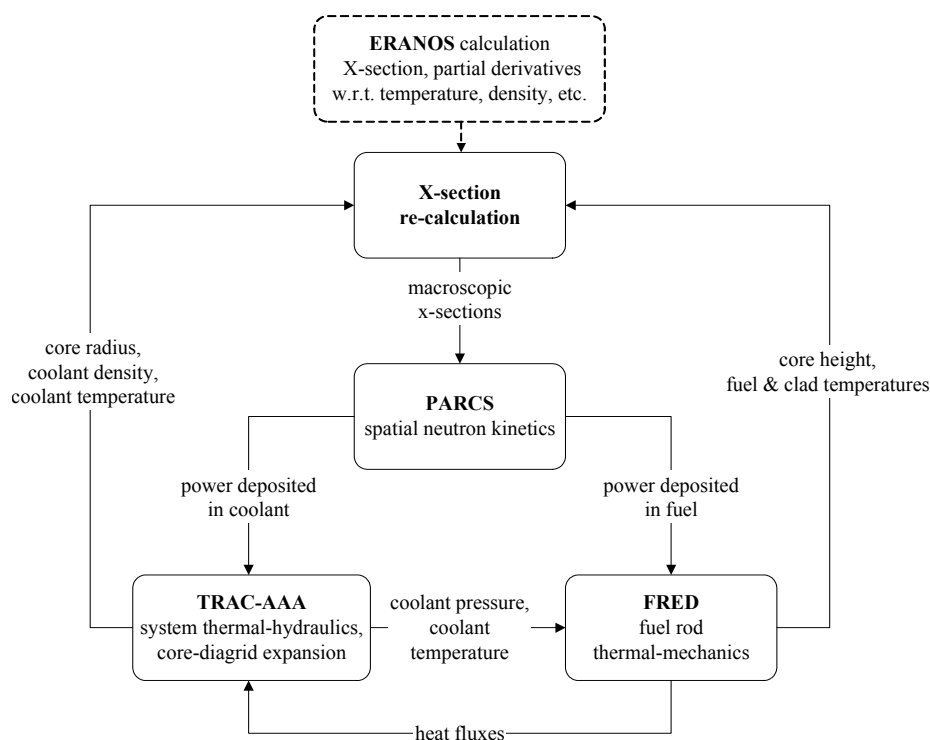


Fig. 1. FAST code system structure

¹ Corresponding author