International Conference on Fast Reactors and Related Fuel Cycles FR22: Sustainable Clean Energy for the Future (CN-291)

Contribution ID: **67** Type: **ORAL**

Verification of SARAX Code for the Transient Analysis of Sodium-cooled Fast Reactor

Thursday 21 April 2022 11:04 (12 minutes)

This paper describes the verification work of SARAX code for the transient analysis of a sodium-cooled fast reactor (SFR). The Advanced Burner Test Reactor (ABTR) benchmark created by Argonne National Laboratory (ANL) was modeled and calculated. The reference core is the 250 MWt sodium-cooled fast reactor, which includes neutronics calculation of the core at the beginning of equilibrium cycle, and also several transient analysis sequence such as ULOF (Unprotected Loss-of-Flow) accident. The SARAX code is a neutronics analysis package developed by the NECP team at Xi'an Jiaotong University and aiming for the advanced reactor R&D. It consists in a cross-section generation code named TULIP, a steady state neutronics calculation code named LAVENDER and a transient analysis code named DAISY. In this paper, the 33-group homogenized cross sections of all materials were generated using TULIP. LAVENDER gave the results of steady state parameters like power distribution, critical control rod position, reactivity coefficients and kinetics parameters. Then, DAISY simulated the transient progress with a space-dependent point-kinetics model and a parallel multi-channel thermal-hydraulics model and gave the results of peaking fuel temperature, cladding temperature and coolant temperature. The simulation of ULOF transients showed that SARAX gave comparable results with the design code of ANL and the SAS4A code, which verified the complete code system for transient calculations of SFR.

Country/Int. organization

China

Authors: JIA, Xiaoqian; ZHENG, youqi; Dr DU, Xianan (Xi'an Jiaotong University)

Presenter: JIA, Xiaoqian

Session Classification: 6.3 Multiscale and Multiphysics Calculations

Track Classification: Track 6. Modelling, Simulations, and Digitilization