Contribution ID: **196** Type: **ORAL**

Detailed engineering neutron codes for calculations of fast breeder reactors

Thursday, June 29, 2017 10:40 AM (20 minutes)

The necessity in detailed engineering codes to perform neutron-physical calculations of the core of nuclear facility is caused by the problems arising during fast reactors design and operation. Diffusion program complexes of neutron-physical calculations with different degrees of assembly representation has been developed and used in IBRAE RAN.
The FUBUKI program is intended for three-dimensional neutron-physical calculation in the fuel element approximation. There are two versions of FUBUKI program. In the FUBUKI-1 fuel assembly is represented by a set of regular hexagonal prisms modelling the fuel cluster surrounded by a set of irregular hexagonal prisms which in their turn simulate the fuel assembly blanket and the surrounding space. At that the boundary microcells belong to two (three for angle) assemblies simultaneously. In the FUBUKI-2 irregular pentagonal prisms belonging only to a single assembly surround the set of prisms that simulates fuel elements. The first version of the program allows performing the calculation of the reactor core in which all fuel assemblies have the same number of fuel elements. The second version of the program allows to perform the calculations of the reactor core in which there are fuel assemblies with different number of fuel elements. Fuel element approximation provides the characteristics of each fuel element.
Program G-7 uses the hex view of the hex assembly in the form of a hexagonal prism as a central cell surrounded by six trapezoidal prisms as external cells. It allows to determinate the fuel assembly blankets and the control and protection system sleeves to the external cells but fuel elements and absorber elements to the central cell. Each cell in the models can have their material content and size.
The paper presents results of existing and planning reactors calculations obtained by the specified programs.

Country/Int. Organization

Russian Federation

Primary author: Mr BELOV, Alexander (Nuclear Safety Institute the of Russian Academy of Sciences)

Co-authors: Mr ASATRJAN, David (IBRAE RAS); Mr SELEZNEV, Evgeny (NUCLEAR SAFETY INSTITUTE OF RUSSIAN ACADEMY OF SCIENCES); Mr KHANBIKOV, ILDAR (IBRAE RAS); Mr BELOUSOV, Victor (IBRAE RAS)

Presenter: Mr BELOV, Alexander (Nuclear Safety Institute the of Russian Academy of Sciences)

Session Classification: 6.9 Research Reactors

Track Classification: Track 6. Test Reactors, Experiments and Modeling and Simulations