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PREPARATION OF A LIBRARY OF MACROSCOPIC SECTIONS IN THE FORMULA FORMAT FOR THE DYN3D REACTOR DIFFUSION CODE FOR ONE FUEL ASSEMBLY BASED ON THE RESULTS OF ITS CALCULATION IN THE CODE SERPENT

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One of the most accurate methods for modeling nuclear reactors is the Monte Carlo method. Today, there are dozens of programs in the world based on this method, but most of them are distributed for money. There is The Serpent code at Joint Institute for Energy and Nuclear Research Sosny. This code is one of the most popular codes in the world but not everyone can get chance to work with this code. I worked with another code earlier, it's the OpenMC code. The OpenMC code is free of charge and open to everyone, so it can be easily used for scientific research. there are many publications mentioned this code. However, there are no publications related to the calculation of a VVER-type reactor.

The purpose of my scientific work was to create a Mathematica package for automatically reading the output files for the Serpent code for the problem under consideration and for selecting the necessary physical quantities (i. e. macroscopic sections, decay and poisoning constants, multiplication factor) depending on the neutron-physical parameters of the core (burnup, boric acid concentration, fuel temperature, moderator temperature, moderator density).

Working on the problem I acquired skills in Mathematica and Serpent, the fitting coefficients were found and written in the required format for the wqs library file, a partition file (_wds.dat) for DYN3D was created, the model of one fuel assembly was made in DYN3D, Keff was calculated using the generated cross section file. The difference between the values in Dyn3D and Serpent was 50 pkm.