Development of Nuclear Data Processing and Utilization System for Innovative Reactors

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A research and development (R&D) project on an integrated nuclear data utilization system started in 2002 for five-year plan for innovative nuclear energy systems such as innovative reactors and accelerator-driven systems.

The integrated nuclear data utilization system is being developed as a modular code system, which consists of nuclear data search, retrieval and graphic plotting engines, and data processing and utilization system.

The system is planning to use on PC-Linux server through Internet for registered users, so that it has a graphic user interface (GUI) in order to easily utilize the system for various nuclear design studies in the innovative reactor development.

The nuclear data processing and utilization system, which is able to handle JENDL-3.3, ENDF/B-VI and JEFF-3 to generate point-wise and group-wise cross sections in several formats, and has a capability to perform criticality and shielding benchmarks. Verification of nuclear data is available by using various criticality and shielding benchmark problems selected from database such as International Criticality Safety Benchmark Experiments Project (ICSBEP) and Shielding Integral Benchmark Archive and Database (SINBAD). The system performance highly depends on the quality of benchmark problems so that good benchmarks should be selected from existing database. We have determined selection criteria for adoption of benchmark problems.

The nuclear data processing and utilization system was constructed on the concept and the procedure of development. A prototype system was developed to examine the operability of the user interface and discuss detailed specifications of the system. The system is expected as a verification tool of nuclear data for development of innovative nuclear reactors, because cross-section generation with nuclear data and the various benchmarks for criticality and shielding problems can be easily performed. The system is also expected to apply quality assurance program for the next JENDL project.

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