

Recent Enhancements of the INSIGHT Integrated In-core Fuel Management Tool

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Abstract

Recent enhancements of the INSIGHT system are described in this paper. The INSIGHT system is an integrated in-core fuel management tool for pressurized water reactors (PWRs) runs on UNIX workstations. The INSIGHT system provides various capabilities which contribute to reduce fuel cycle cost and workload of in-core fuel management tasks, i.e. core follow calculations, interactive loading pattern design, automated multicycle analysis and interface between detailed core calculation codes. To minimize engineers' workload, most of input data for analysis modules are automatically generated by the INSIGHT system through specification of calculation conditions in the graphic user interface. Recent enhancements of the INSIGHT system are mainly focused to improve efficiency of loading pattern optimization and flexibility of multicycle analyses. To increase optimization efficiency, a parallel calculation capability, various optimization theories, extension of heuristic rules, screening by neural networks and so on were incorporated in the loading pattern optimization module. The multicycle analyses module was rewritten to increase flexibility such as cycle dependent specification of loading pattern search methods and so on. The INSIGHT system is currently used by Japanese utilities not only for regular in-core fuel management tasks but also for strategic fuel management studies to reduce fuel cycle cost.