Development of the Integrated Core On-line Monitoring and Protection Aid Surveillance System

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Abstract

The integrated Core On-line Monitoring and Protection Aid Surveillance System (COMPASS) is developed for the purpose of supporting the reactor operation, based on the three-dimensional nodal design code, MASTER. The heart of COMPASS is an adaptive nodal core simulator for the on-line calculation of three-dimensional assembly and pin power distributions which are used for the evaluation of the thermal margins and for the guide in operation. In this paper, the overall structures and the solution methods of COMPASS are described. The uncertainty of COMPASS for SMART core was also evaluated by comparing that of MASTER. The results showed that COMPASS uncertainty in power shape prediction is identical to that of the design code system, MASTER. The application of COMPASS to the analysis of peaking factor for SMART core resulted with about 4% gain in peaking factor margin when compared to COLSS.