

HELIOS/AFEN Pin Power Reconstruction Based on Modulation Method with Group Dependent Power Form Function

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Abstract

The energy group dependent power form function has been developed for pin power reconstruction for the MOX fuel assembly. The HELIOS/AFEN pin power reconstruction procedure, based on the single assembly calculation for group dependent power form function and nodal group constants generation, has been verified against two mock-ups (ALL-MOX and GD-MOX) of PWR critical experiments loaded with high plutonium content MOX fuels. The AFEN reconstructed pin powers in MOX and UO₂ fuel assemblies are in good agreement with the experiments; the RMS error is about 1.7% for the MOX assembly of both mock-ups, which is comparable to 1.9% for the UO₂ fuel assembly. This result assures the quality of HELIOS/AFEN procedure in accurately calculating the pin power distribution in PWR core intermixed with high plutonium content MOX and UO₂ fuel assemblies.