عنوان مقاله:

Investigation of the use of momentum and Galerkin weighting functions in high-order Nodal expansion method to solve the neutron diffusion equation

محل انتشار:

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نویسندگان:

Ali Kolali - *Department of Energy Engineering, Sharif University of Technology, P.O. Box ۱۴۵۶۵-۱۱۱۴, Tehran, Iran*

Davod Naghavi Dizaji - *Department of Energy Engineering, Sharif University of Technology, P.O. Box ۱۴۵۶۵-۱۱۱۴, Tehran, Iran*

Naser Vosoughi - *Department of Energy Engineering, Sharif University of Technology, P.O. Box ۱۴۵۶۵-۱۱۱۴, Tehran, Iran*

خلاصه مقاله:

In this study, after discretization of the neutron diffusion equation and adjoint with high-order nodal expansion method in two dimensions and two energy groups, calculations with Momentum and Galerkin weighting functions for rectangular geometry (BIBLIS-۲D) and hexagonal geometry (IAEA-۲D) reactors are performed. The mean of relative power error for Momentum and Galerkin weighting functions was calculated in BIBLIS-۲D reactor ۰.۴۲% and ۰.۶۲%, respectively, and for IAEA-۲D reactor ۴.۹۶% and ۳.۵۲%, respectively. Regarding the results, it was concluded that in order to increase accuracy with the acceptable time of computing (۴ Seconds for rectangular geometry and ۲۸ seconds for hexagonal geometry with Intel® Core™ i۷-۴۵۱۰U Processor), the Momentum weighting function for rectangular geometry and the Galerkin weighting function for hexagonal geometry can be used to discretize equations without reducing the node size. Therefore, to increase the accuracy while maintaining the speed of calculations, without reducing the size of nodes, the appropriate weighting function can be used in discretization, which can be very useful in performing calculations of different transients.

کلمات کلیدی:

simulator, Adjoint Calculation, diffusion equation, Rectangular Geometry, Hexagonal Geometry, HACNEM

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