عنوان مقاله:

Second order average current nodal expansion method for time-dependent neutron diffusion simulation

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خلاصه مقاله:

In the present work, a time-dependent neutron diffusion simulator is developed utilizing the second order of average current nodal expansion method. Generally, nodal methods can accurately simulate the reactor core with coarse meshes as long as the sizes of a fuel assembly. In this case, an adopted iterative approach is used for resolving the time-dependent three-dimensional multi-group neutron balance equations coupled with six-group precursor equations. In order to evaluate the implemented methodology, two popular transient problems are used including TWIGL two-dimensional seed-blanket reactor and three-dimensional LMW LWR. For indicating the precision of the method, the numerical results of high (second) order approach also have been compared with the basic methodology i.e. the zeroth order solution. From the comparison of obtained results with references, the suitable and precise simulating of transient schemes can be comprehended using the time-dependent second order average current nodal expansion method. Moreover, the results confirm that the second order solution can treat the coarse mesh dynamic problems .with more accuracy relative to the basic approach

کلمات کلیدی:

Second order of average current nodal expansion method, Neutron diffusion equation, Transient treatment, Precursor equations