

Experience with Monte Carlo Variance Reduction Using Adjoint Solutions in HYPER Neutronics Analysis

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Abstract

The variance reduction techniques using adjoint solutions are applied to the Monte Carlo calculation of the HYPER(HYbrid Power Extraction Reactor) core neutronics. The applied variance reduction techniques are the geometry splitting and the weight windows. The weight bounds and the cell importance needed for these techniques are generated from an adjoint discrete ordinate calculation by the two-dimensional TWODANT code. The flux distribution variances of the Monte Carlo calculations by these variance reduction techniques are compared with the results of the standard Monte Carlo calculations. It is shown that the variance reduction techniques using adjoint solutions to the HYPER core neutronics result in a decrease in the efficiency of the Monte Carlo calculation.