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Neutron angular flux reconstruction in slab geometry using multigroup discrete ordinates transport models

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ABSTRACT

In this article, we present an application of the coarse-mesh Deterministic Spectral Method (SDM) to generate multigroup angular fluxes in one-dimensional spatial domains using the neutron transport stationary equation, in the formulation of discrete ordinates (S_N), considering isotropic scattering source. After obtaining the analytical solution of the S_N equations, we replace the integral term of the scattering source in the original neutron transport equation. Thus, we obtain analytically two expressions for angular fluxes in the multigroup formulation, considering the neutron propagation in the positive ($\mu > 0$) and negative ($\mu < 0$) directions, presenting a meaningful reduction in the computational time of simulations of typical neutron shielding problems.

Keywords: **neutron transport theory, discrete Ordinate method, angular reconstruction methodology**

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