

# Turkish Journal of Physics

Turkish Journal

of

Physics

The Milne and the Constant Source Problems for the FBIS Kernel

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**Abstract:** Transport solutions to the monoenergetic constant source and the Milne problems for the forward-backward-isotropic scattering (FBIS) kernel are obtained by method of singular expansion modes. The monoenergetic linear transport equation for extremely anisotropic scattering with constant source is reduced to a transport equation with isotropic scattering. The expansion coefficient is obtained in a form involving exact integral equations and determined by the accompanying new boundary conditions and the half-range orthogonality relations. In the zeroth order approximation, the analytical expressions for neutron density and the emergent angular distributions are also obtained as a function of forward scattering.

 [Keywords](#)  
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Turk. J. Phys., **22**, (1998), 461-468.

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