

Revisiting the Chandrasekhar Equation of Radiative Transfer

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ABSTRACT

We consider the Chandrasekhar equation of radiative transfer in the non-conservative case for axially symmetric problems in a semi-infinite atmosphere. This formulation, which accounts for albedo due to atmospheric scattering, is a differential-integro equation for the flux intensity.

The equation may be treated either as an initial-value problem, or as a two-boundary-value problem. In this talk we consider the initial value case.

We construct an infinite set of new solutions. The (total) solution is presumably a composite of the Chandrasekhar function with a linear combination of the new solution set which together satisfy the given (arbitrary) initial conditions.

We also demonstrate that while any solution to the initial value problem is unique, it is ill posed. Numerical evaluation of the coefficients required to satisfy given initial conditions support this conclusion.