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Numerical Investigation of Temperature Profiles in Gray Gas Mediums with Combined Radiation-Conduction Heat Transfer

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In this paper we numerically formulate and solve for the temperature profile in a gaseous planar layer modelled as a gray medium with coupled radiation-conduction heat transfer. The problem is specified in terms of the integral equation representation of the energy equation with a radiative source term which is first solved by finite differences. Results are then investigated for accuracy by comparing to a spherical harmonic based solution of differing orders. Extensions of the integral equation to include scattering effects in terms of the conduction-radiation Stark parameter are briefly discussed and contrasted to spherical harmonic and discrete ordinate approximations.

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No

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Yes

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