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EFFECT OF RADIATIONS ON UNSTEADY HEAT AND MASS TRANSFER OF A CHEMICALLY REACTIVE FLUID PAST A SEMI-INFINITE VERTICAL PLATE WITH VISCOUS DISSIPATION

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Abstract

The objectives of the present study are to investigate the unsteady two-dimensional laminar boundary layer flow of a viscous, incompressible, radiating fluid along a semi-infinite vertical plate in the presence of thermal and concentration buoyancy effects is considered, by taking the effect of viscous dissipation into account. The fluid is a gray, emitting and absorbing radiation, but non-scattering medium and considering the fluid to be optically thick, the Rosseland approximation is used to describe the radiative heat flux in the energy equation. The governing equations are solved by perturbation approximation. Numerical results for the velocity, temperature and concentration were computed with respect to the variations in the governing parameters viz., the thermal Grashof number G_r, the solutal Grashof number G_e, Prandtl number P_r, Schemidt number S_c, Radiation parameter R, Eckert number E_c and chemical reaction parameter kr.

Keyword: Free convection, Rosseland approximation, Vertical plate, heat transfer, mass transfer.

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