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EFFECTS OF SORET AND MAGNETIC FIELD ON UNSTEADY FLOW OF A RADIATING AND CHEMICAL REACTING FLUID: A FINITE DIFFERENCE APPROACH

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ABSTRACT

The present study deals with the effects of magnetic field and Soret number variation on unsteady laminar boundary layer flow of a radiating and chemically reacting incompressible viscous fluid along a semi-infinite vertical plate. The governing boundary layer equations are solved numerically, using Crank-Nicholson method. The Roseland approximation is used to describe the radiative heat flux in the energy equation. Computations are performed for wide range of the governing flow parameters, viz. the thermal Grash of number, Solutal Grash of number, Magnetic parameter, Soret number, Prandtl number and thermal radiation parameter. The variations of these different flow parameters on velocity, temperature and concentration fields are discussed graphically. Also, the results of skin friction coefficient, Nusselt number and Shear wood number for various flow parameters are discussed. From this study, it is found that, an increase in the soret number leads to an increase in the velocity, concentration of the fluid.

KEYWORDS: Thermal Diffusion (Soret), Magnetic Field, Chemical Reaction, Crank, Nicholson Method, Radiative Heat Flux