Mixed Convection Boundary Layer Flow over a Stretching Surface Filled with a Maxwell Fluid in Presence of Soret and Dufour Effects

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This article looks at the heat and mass transfer characteristics in mixed convection boundary layer flow about a linearly stretching vertical surface. An incompressible Maxwell fluid occupying the porous space takes into account the diffusion-thermo (Dufour) and thermal-diffusion (Soret) effects. The governing partial differential equations are transformed into a set of coupled ordinary differential equations, by invoking similarity transformations. The involved nonlinear differential system is solved analytically using the homotopy analysis method (HAM) to determine the convergent series expressions of velocity, temperature, and concentration. The physical interpretation to these expressions is assigned through graphs and tables for the Nusselt number $\theta'(0)$ and the Sherwood number $\phi'(0)$. The dependence of suction parameter S, mixed convection parameter λ, Lewis number Le, Prandtl number Pr, Deborah number β, concentration buoyancy parameter N, porosity parameter γ, Dufour number Df, and Soret number Sr is seen on the flow quantities.

Key words: Series Solution; Maxwell Fluid; Heat Transfer.