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Unsteady Two Dimensional Mixed Convection MHD Couple Stress Fluid Flow

through an Inclined Stretching Sheet with Chemical Reaction

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Abstract:

In this work, the investigation has focused on the unsteady hydromagnetic mixed convection couple stress fluid through an inclined linearly stretching sheet. The model equations governing the flow are converted to ordinary differential equations employing appropriate similarity transformation variables. An efficient technique, Runge-Kutta 4th order (RK4) technique together with shooting method is deployed to tackle the dimensionless equations with relevant boundary conditions. The impacts of various parameters such as unsteadiness parameter, Hartman number, mixed convection parameter, concentration buoyancy parameter, angle of inclination, chemical reaction parameter and Schmidt number are analysed and discussed with plots. Fluid velocity decreases as the unsteadiness, Hartman number, Schmidt number, and chemical reaction parameters rise; while the angle of inclination, mixed convection, and concentration buoyancy parameters speed up the flow. Furthermore, the unsteadiness, angle of inclination and mixed convection parameters reduce fluid temperature, while all the parameters reduce flow concentration.

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