Hall Effects on MHD Rotating Flow Past an Exponentially Accelerated Inclined Plate with Variable Temperature and Uniform Mass Diffusion

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ABSTRACT

A theoretical solution is presented for the problem of magneto hydrodynamic fluid flow past an exponentially accelerated inclined plate in the presence of Hall current, relative to the rotating fluid with variable temperature and uniform mass diffusion. The solution involves solving the dimensionless equations using Laplace transform technique and obtaining graphical outputs using MATLAB. The parameters considered in the analysis include Schmidt number, Prandtl number, Hall parameter (m), Hartmann number (M), rotation parameter (Ω), thermal Grashof number (Gr), mass Grashof number (Gc), and the angle of inclination (α). From the graphical output, it is observed that the axial velocity increases with increasing values of both the rotation parameter and the angle of inclination parameter. However, the transverse velocity decreases with increasing values of the magnetic parameter (M), rotation parameter and the angle of inclination parameter. Interestingly, the trend is reversed in the case of Hall parameter (m).

Keywords: Hall Effect, Inclined plate, Uniform mass diffusion

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