Magnetohydrodynamic Three-Dimensional Flow of a Second-Grade Fluid with Heat Transfer

Tasawar Hayat[a,b] and Muhammad Nawaz[a]

[a] Department of Mathematics, Quaid-I-Azam University 45320, Islamabad 44000, Pakistan
[b] Department of Mathematics, College of Sciences, KS University, P.O. Box 2455, Riyadh 11451, Saudi Arabia

Reprint requests to T. H.; E-mail: pensy_t@yahoo.com

An analysis has been carried out for the heat transfer on steady boundary layer flow of a second-grade fluid bounded by a stretching sheet. The magnetohydrodynamic nature of the fluid is considered in the presence of Hall and ion-slip currents. The nonlinear mathematical problem is computed by a powerful tool, namely, the homotopy analysis method (HAM). A comparative study between the present and existing limiting results is carefully made. Convergence regarding the obtained solution is discussed. Skin friction coefficients and Nusselt number are analyzed. Effects of embedded parameters on the dimensionless velocities and temperature are examined.

Key words: Hall and Ion-Slip Currents; Stretching Surface; Skin Friction Coefficient; Nusselt Number.