

Steady Flow of an Electrically Conducting Incompressible Viscoelastic Fluid over a Heated Plate

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The transformation group theoretic approach is applied to the problem of the flow of an electrically conducting incompressible viscoelastic fluid near the forward stagnation point of a heated plate. The application of one-parameter transformation group reduces the number of independent variables, by one, and consequently the basic equations governing flow and heat transfer are reduced to a set of ordinary differential equations. These equations have been solved approximately subject to the relevant boundary conditions by employing the shooting numerical technique. The effect of the magnetic parameter M , the Prandtl number Pr and the non-dimensional elastic parameter representing the non-Newtonian character of the fluid k on velocity field, shear stress, temperature distribution and heat flux are carefully examined.

Key words: One-parameter Transformation Group; Viscoelastic Fluid; Non-Newtonian Fluid.