Hydromagnetic flow between two parallel porous plates with constant suction.

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ABSTRACT

In this study, hydromagnetic fluid flow between two parallel porous plates has been investigated. In our model the plates are subjected to a constant suction and there is magnetic field acting in a direction orthogonal to the flow. The lower plate is heated such that it is at a higher temperature than the upper plate and the fluid rises by free convection. At the initial time (t=0) the lower plate is moving at a constant velocity in the direction parallel to the fluid flow while the upper plate is stationary. At a time greater than zero, the upper plate starts moving at a constant velocity in the direction parallel to the fluid flow while the lower plate remains stationary. In our study, the flow is unsteady and is restricted to the laminar domain. The equations governing the flow are non-linear and thus their exact solution is not possible. To solve these equations a finite difference scheme has been developed that reduces the problem to a system of algebraic equations. The algebraic equations have been solved iteratively by the use of the computer. In this study, the effects of suction, injection, constant heat flux, mass diffusion and time on the velocity, temperature and concentration on the boundary layer are analyzed. The results obtained are given in graphs and tables.