

Hydromagnetic Natural Convection Flow between Vertical Parallel Plates with Time-Periodic Boundary Conditions

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Abstract: In this paper, the free convective flow of magnetohydrodynamic fluid through a channel with time periodic boundary condition is investigated by taking the effects of Joule dissipation into consideration. Based on simplifying assumptions, the coupled governing equations are reduced to a set of nonlinear boundary valued problem. Approximate solutions are obtained by using semi-analytical Adomian decomposition method. The effect of pertinent parameters on the fluid velocity, temperature distribution, Nusselt number and skin friction are presented graphically and discussed. The result of the computation shows that an increase in the magnetic field intensity has significant influence on the fluid flow.

Keywords: Natural convection, Magnetic field, Time periodic boundary condition, Viscous dissipation