

FREE AND FORCED CONVECTION MHD OSCILLATORY FLOW AND HEAT TRANSFER THROUGH A POROUS MEDIUM WITH CONSTANT SUCTION IN PRESENCE OF A HEAT SOURCE

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Abstract

The study of a two dimensional unsteady free convective and mass transfer flow of an electrically conducting incompressible viscous fluid through a porous medium bounded by an infinite vertical porous plate in presence of a heat source has been presented, when the plate temperature varies periodically with time. A uniform magnetic field is applied transversely to the direction of the flow. The flow is subjected to constant suction velocity. The governing equations are solved by using regular perturbation technique. The magnetic Reynolds number is assumed to be small so that the induced magnetic field can be neglected. The discussion is confined to the small Eckert number E . The expressions for non-dimensional skin friction in the direction of the flow and the rate of heat transfer in terms of Nusselt number at the plate are obtained. The amplitudes and the phases of the fluctuating parts of the skin friction and the heat transfer at the plate are demonstrated graphically for different values of the physical parameters involved.

Key Words : MHD, Electrically conducting, Viscous incompressible, Convection, Skin friction, Nusselt Number.