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Hydromagnetic Free Convection Flow Past A Semi-Infinite Vertical
Porous Plate Subjected To Constant Heat Flux With Radiation
Absorption.

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ABSTRACT

In this study we discuss an unsteady free convection MHD flow past semi-infinite vertical porous plate. The study is restricted to the laminar boundary layer. We have considered the flow in the presence of a strong magnetic field therefore the electromagnetic force is very large, thus the diffusion velocity of the electrons as well as of ions cannot be neglected. This phenomenon is referred to as Ion-Slip current. An induced electric current known as Hall current exists due to the presence of both the electric field and the magnetic field. The effects of these two parameters i.e. Ion-Slip current and Hall current is presented. As the partial differential equations governing this problem are highly non-linear they are solved numerically using a finite difference scheme. Further we have investigated the effects of various parameters on the velocity, temperature and concentration profiles. The profiles are presented in graphs. The skin friction and the rate of mass transfer are calculated using the Newton's interpolation formula and rate of heat transfer calculated using the Nusselt Number. The results are presented in tables.

In our study we have noted that the Hall current, Ion slip current, constant heat flux, dissipative heat and radiation absorption affects the velocity, temperature, skin friction and the rate of heat transfer but have no effect on the rate of mass transfer.