

عنوان مقاله:

Mixed Convection at a Vertical Plate in a Porous Medium with Magnetic Field and Variable Viscosity

محل انتشار:

دوماهنامه مکانیک سیالات کاربردی، دوره 5، شماره 4 (سال: 1392)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

A numerical study of a mixed convection boundary layer flow on a vertical plate in a porous medium with magnetic field, variable wall temperature and variable viscosity is made in this paper using the Darcy model. A free stream that varies as a power function of distance along the plate is assumed to flow parallel to the plate. Similarity solutions are obtained for the problem for both assisting flow and opposing flow. In the opposing flow case dual solutions are obtained for certain values of the parameters, and occurrence of boundary layer separation is also observed. Significant differences are observed between the behaviors of the two solutions of the dual solution case. Critical values of the mixed convection parameter are also obtained beyond which there exists no solution for the problem. Some of the observations of the analysis are - the range of values of the mixed convection parameter over which solutions exist for the problem is more in the presence of magnetic field than in its absence and also in the variable wall temperature case than in the isothermal case. Both local drag coefficient and heat transfer coefficient assume only positive values in the isothermal case while they assume both positive and negative values in the varying wall temperature case. Drag is less in the presence of magnetic field than in its absence and also in the isothermal case than in the varying wall temperature case. Heat transfer coefficient diminishes in the absence of magnetic field than in the presence of magnetic field.

کلمات کلیدی:

Mixed convection, Varying wall temperature, variable viscosity, Magnetic field

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