

Mixed convection boundary layer flow along a vertical flat plate embedded in a porous medium with a convective boundary condition

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An analysis of the problem of steady mixed convection boundary layer flow from the right face of a semi-infinite vertical surface embedded in a fluid-saturated porous medium is presented. It is assumed that the left face of the plate is in contact with a hot or cooled flowing fluid. Using an appropriate similarity transformation, the governing system of partial differential equations are transformed into a system of ordinary differential equations, before being solved numerically. We investigate the dependence of the reduced Nusselt number on the convective (Biot number) and the buoyancy or mixed convection parameters. The results indicate that dual solutions exist for buoyancy opposing flow, while for the assisting flow, the solution is unique.