

**Effect of variable viscosity on combined forced and free convection boundary-layer flow over a horizontal plate with blowing or suction**

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**Abstract:** The effects of variable viscosity, blowing or suction on mixed convection flow of a viscous incompressible fluid past a semi-infinite horizontal flat plate aligned parallel to a uniform free stream in the presence of the wall temperature distribution inversely proportional to the square root of the distance from the leading edge have been investigated. The equations governing the flow are transformed into a system of coupled non-linear ordinary differential equations by using similarity variables. The similarity equations have been solved numerically. The effect of the viscosity temperature parameter, the buoyancy parameter and the blowing or suction parameter on the velocity and temperature profiles as well as on the skin-friction coefficient and the Nusselt number are discussed.

**Keywords:** Mixed convection; variable viscosity; blowing or suction.

**1. Introduction:**

Combined forced and free convection or "mixed" convection arises in many transport processes in natural and engineering applications. Atmospheric-boundary layer flow, heat exchangers, solar collectors, nuclear reactors and electronic equipment are examples in which the effect of buoyancy force on forced flow is significant.

In contrast to the problem of mixed convective flow along a vertical flat plate, less attention has been given to studies of buoyancy force effects