Mixed convection boundary layer flow along vertical thin needles : assiting and opposing flows.

ABSTRACT

The problem of steady laminar mixed convection boundary layer flow of an incompressible viscous fluid along vertical thin needles for both assisting and opposing flow cases is considered in this paper. The transformed boundary layer equations are solved numerically using an implicit finite-difference scheme known as the Keller-box method. Numerical computations are carried out for various values of the dimensionless parameters of the problem, namely the mixed convection parameter λ and the parameter a representing the needle size, with Prandtl number, Pr = 0.7. It has been found that the flow and heat transfer characteristics are significantly influenced by these parameters.

Keyword: Boundary layer flow; Mixed convection; Vertical thin needles.