
MD. KAMRUJJAMAN, University of Calgary, AB, Canada

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Abstract: The effect of small amplitude oscillations of the surface temperature with time dependent free stream velocity on mixed convection flow of a viscous incompressible fluid along a horizontal circular cylinder is considered. The problem is simplified by employing the laminar boundary layer and Boussinesq approximations. Implicit finite-difference scheme is used to solve the dimensionless governing equations. Where solutions are obtained as functions of the curvature parameter X on the entire surface of the cylinder $[0, \pi]$. The results are shown graphically in terms of amplitude and phase of the Nusselt number for fluids having Prandtl number, $Pr=1.0$ and for different values of a mixed convection parameter λ . Streamlines and isotherms as well as transient shear stress and heat transfer are also represented for the effect of λ and frequency parameter ω .