

## **Mixed convection boundary layer flow over a permeable vertical cylinder with prescribed surface heat flux.**

### ABSTRACT

In this study we investigate the steady mixed convection boundary layer flow along a permeable vertical cylinder with prescribed surface heat flux. The free stream velocity and the surface heat flux are assumed to vary linearly with the distance from the leading edge. The governing system of partial differential equations is first transformed into a system of ordinary differential equations, and the transformed equations are solved numerically for both assisting and opposing flow regimes using two different methods, namely the Keller-box method and the NAG routine D02HAF. The features of the flow and heat transfer characteristics for different values of the governing parameters are analyzed and discussed. Dual solutions for the previously studied mixed convection boundary layer flow over an impermeable surface of the cylinder are shown to exist also in the present problem for aiding and opposing flow situations.

**Keyword:** Boundary layer; Heat flux; Partial differential equations.