

## **Mixed convection boundary layer flow near the lower stagnation point of a cylinder embedded in a porous medium using a thermal nonequilibrium model**

### **ABSTRACT**

The present paper analyzes the problem of two-dimensional mixed convection boundary layer flow near the lower stagnation point of a cylinder embedded in a porous medium. It is assumed that the Darcy's law holds and that the solid and fluid phases of the medium are not in thermal equilibrium. 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 by a finite-difference method. We investigate the dependence of the Nusselt number on the solid-fluid parameters, thermal conductivity ratio and the mixed convection parameter. The results indicate that dual solutions exist for buoyancy opposing flow, while for the assisting flow, the solution is unique.

**Keyword:** Natural convection; Porous media; Mixed convection