Boundary layer flow and heat transfer over a stretching cylinder in a copper-water nanofluid

ABSTRACT

The problem of boundary layer flow and heat transfer over a stretching cylinder in a Copper-water nanofluid is considered in this study. The governing partial differential equations in cylindrical form are transformed into ordinary differential equations by a similarity transformation. Then, the transformed equations are solved numerically using a shooting method with Prandtl number Pr=6.2. The results of skin friction coefficient, local Nusselt number, velocity profiles and temperature profiles for different values of the governing parameters are presented graphically. The effects of the curvature parameter, suction parameter, skin friction coefficient and local Nusselt number on the flow and heat transfer characteristics are discussed. The study indicates that dual solutions exist for the stretching cylinder. It is observed that the surface shear stress at the surface decrease while the heat transfer rate at the surface increase as the curvature parameter increases.

Keyword: Boundary layer flow; Heat transfer; Stretching cylinder; Copper-water nanofluid