Rotating flow over a permeable shrinking surface in a nanofluid

ABSTRACT

An analysis has been made in order to study the effects of the rotating flow over a shrinking permeable surface in a water-based nanofluid. Three different types of nanoparticles namely, copper (Cu), alumina (Al2O3) and titania (TiO2) are considered by using water-based fluid with the Prandtl number Pr = 6.2. The resulting systems of ordinary differential equations are solved numerically using a shooting method built in Maple Software for some values of the governing parameters. The influence of the rotation q , nanoparticle volume fraction ű and suctions parameters on the fluid flow and heat transfer characteristics are taken into account. The results for the skin friction coefficients, local Nusselt number, velocity as well as temperature profiles obtained are graphically presented and have been discussed in particular. The study revealed that the dual solutions exist in a certain range of the governing parameters.

Keyword: Rotating flow; Shrinking permeable surface; Nanofluid; Dual solutions