Flow and heat transfer towards a stretching surface in a rotating nanofluid with suction

ABSTRACT

This numerical study is concerned with the rotating boundary layer flow past a stretching surface with the presence of suction in a water-based nanofluid. There are three types of nanoparticles that we consider in this study, namely copper Cu, alumina Al2O3 and titania TiO2 . Similarity transformations are used to transform the governing equations corresponding to the momentum and energy equations in the form of partial differential equations into nonlinear ordinary differential equations. Later, these ordinary differential equations are solved numerically by using a shooting method which implemented in Maple software. The results for the skin friction coefficients, local Nusselt number, velocity and the temperature profiles are graphically presented through graphs for various values of the physical parameters of interest, namely rotation, suction and nanoparticle volume fraction parameters. It is revealed from the study that the presence of the suction at the boundary widen the range for which the solutions exist.

Keyword: Dual solutions; Heat transfer; Nanofluid; Rotating flow; Stretching surface