

MHD stagnation-point flow of a nanofluid past a stretching/shrinking sheet with induced magnetic field

ABSTRACT

The problem of the steady two dimensional stagnation-point flow of an incompressible electrically conducting nanofluid caused by a stretching/shrinking surface is studied. The effect of an induced magnetic field is taken into account. The nonlinear partial differential equations are transformed into nonlinear ordinary differential equations via. similarity transformations. The transformed governing equations are solved numerically using the shooting method which built in function in Maple Software. The effects of governing parameters on the skin friction coefficient, the local Nusselt number, the local sherwood number and the velocity, temperature and concentration profiles are also presented in this study. It is found that dual solutions exist for the shrinking case. Therefore, a stability analysis is performed to verify which solution is stable and it is found that the first solution is physically stable while the second solution is unstable.

Keyword: Dual solutions; induced magnetic field; Nanofluid; Stagnation-point; Stretching/shrinking; Verify