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ORIGINAL ARTICLE

Cu-water nanofluid flow induced by a vertical stretching sheet in presence of a magnetic field with convective heat transfer

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Abstract The convective heat transfer performance of nanofluid over a permeable stretching sheet with thermal convective boundary condition in presence of magnetic field and slip velocity is studied in the present paper. Cu-water nanofluid is used to investigate the effect of nanoparticles on the flow and heat transfer characteristic. The numerical results are compared with published results and are found in an excellent agreement. The influences of various relevant parameters on the velocity and temperature as well as the rate of shear stress and the rate of heat transfer are elucidated through graphs and tables. It is observed that nanoparticles volume fraction and surface convection parameter both increase the thickness of thermal boundary layer.

1. Introduction

A nanofluid, coined by Choi [1] is a new type of heat transfer fluids containing base fluid and nanoparticles. It has been observed from the open literature that nanoparticles changed the fluid characteristics duo to high thermal conductivity of these particles. Nanofluids are produced by solid nanoparticles dispersion in a base fluid like water, ethylene glycol etc. The nanoparticles which are used to produce nanofluid are copper, aluminum etc. The enhanced thermal conductivity of nanofluid and turbulence induced by their motion contribute to a remarkable improvement in the convective heat transfer coefficient. These features of nanofluid make them attractive for use in application such as advanced nuclear system [2] and cylindrical heat pipes

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