

The Physical Impact of Nano-Layer Due to Dispersions of Carbon Nano-Tubes through an Absorbent Channel: A Numerical Nano-Fluid Flow Model

Authors : Muhammad Zubair Akbar Qureshi, Abdul Bari Farooq

Abstract : The intention of the current study to analyze the significance of nano-layer in incompressible magneto-hydrodynamics (MHD) flow of a Newtonian nano-fluid consisting of carbon nano-materials has been considered through an absorbent channel with moving porous walls. Using applicable similarity transforms, the governing equations are converted into a system of nonlinear ordinary differential equations which are solved by using the 4th-order Runge-Kutta technique together with shooting methodology. The phenomena of nano-layer have also been modeled mathematically. The inspiration behind this segment is to reveal the behavior of involved parameters on velocity and temperature profiles. A detailed table is presented in which the effects of involved parameters on shear stress and heat transfer rate are discussed. Specially presented the impact of the thickness of the nano-layer and radius of the particle on the temperature profile. We observed that due to an increase in the thickness of the nano-layer, the heat transfer rate increases rapidly. The consequences of this research may be advantageous to the applications of biotechnology and industrial motive.

Keywords : carbon nano-tubes, magneto-hydrodynamics, nano-layer, thermal conductivity

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