STAGNATION POINT FLOW OF CARBON NANOTUBE HYBRID NANOFLUID PAST A STRETCHING SHEET WITH HEAT GENERATION/ABSORPTION

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ABSTRACT

Hybrid nanofluid are a new fluid created by blending two different types of nanoparticles in the same base fluid to enhance the properties of base fluid. The incorporation of carbon nanotubes (CNTs) into a base fluid greatly enhances heat transfer performance over metal-based nanofluids. Hence, the stagnation point flow of a carbon nanotube hybrid nanofluid across a stretching sheet with heat generation/absorption is the focus of this study. The similarity transformation variables are used to transform the partial differential equations (PDEs) into less complex form of ordinary differential equations (ODEs). The obtained ODEs are then encoded in Maple using the Runge-Kutta Fehlberg Fourth Fifth (RKF45) method. The result is verified by comparing the results with previous studies. The results and discussion are focused on several parameters, including of Prandtl number, conjugate parameter, stretching parameter, heat sink/source parameter, magnetic field parameter, aligned angle parameter, volume fraction of nanoparticles over the skin friction coefficient, velocity, and temperature profiles. The results show that the velocity profile increases due to the increasing stretching parameter and volume fraction of Cu and decreases due to the increasing volume fraction of $SWCNT$, aligned angle parameter and magnetic field parameter. The increasing value of Prandtl number, conjugate parameter and heat source/sink parameter showed no effect on velocity. The temperature profile increases due to the increasing conjugate parameter, magnetic field parameter, aligned angle parameter and the volume fraction parameter. Meanwhile, the temperature profile decreases owing to the increase of stretching parameter, heat source/sink parameter and Prandtl number.

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