MHD Stagnation Point Flow of Ternary Hybrid Nanofluid Flow over a Stretching/Shrinking Cylinder with Suction and Ohmic Heating

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Abstract

There is a new type of nanofluid called ternary hybrid nanofluid that can be used to improve heat flow. This study investigates effects of magnetic field, mass suction with ohmic heating towards stagnation region of stretching/shrinking cylinder of polymer based ternary hybrid nanofluid flows in two dimensions with different shapes aspect. Under the imposed assumptions, equations governing the flow will be modelled. It is feasible to convert nonlinear partial differential equations that are not exactly solvable via similarity transformation to a system of ordinary differential equations, which are solved numerically. The combination of Runge–Kutta-IV and shooting method in Mathematica has been shown to have a substantial impact on the prevalence of heat exchange and the mobility parameters of ternary hybrid nanofluids. The number of nanoparticles with suction enhances heat transfer and skin friction coefficient. Graphs and tables demonstrated the influence of many factors such as suction, Reynold number, nanoparticles volume fraction, magnetic field, Eckert number, stretching/shrinking on temperature, velocity, skin friction and local heat transfer rate coefficients curves. To verify the findings, a contrast study was undertaken between the current research and previously published results for a specific instance, and excellent agreement was discovered.

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