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Thermal radiation and MHD effects on boundary layer flow of micropolar nanofluid past a stretching sheet with non-uniform heat source/sink

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Abstract

In this paper, the study of electrically conducting micropolar nanofluids flow over a stretching sheet influencing by thermal radiation and non-uniform heat source/sink in presence of transverse magnetic field investigated numerically and simulated with RungeKutta-Fehlberg method with shooting techniques. Governing nonlinear boundary layer equations for momentum, energy and continuity equations are transformed into a system of nonlinear ordinary coupled differential equations by using similarity transformations. Influences of nanoparticle concentration and different emerging parameters on flow profiles are presented graphically coupled with comprehensive discussions for four types of metallic or nonmetallic nanoparticles, namely silver (Ag), copper (Cu), alumina (Al_2O_3) and titanium dioxide (TiO_2) in water based micropolar fluid in order to show some interesting phenomena. Effect of different parameters on skin friction coefficient, couple stress and local Nusselt number are also discussed.

Keywords: Nanofluids; micropolar; magnetic field; thermal radiation; suction; non-uniform heat source/sink.

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