Abstract

A numerical analysis is performed on buoyancy and magnetic effects on a steady two-dimensional boundary layer flow of an electrically conducting water-based nanofluid containing three different types of nanoparticles: copper (Cu), aluminium oxide (Al_2O_3), and titanium dioxide (TiO_2) past a convectively heated porous vertical plate with variable suction. A similarity transformation was used to convert the governing partial differential equations to a system of nonlinear ordinary differential equations. A numerical shooting technique with a fourth-order Runge–Kutta–Fehlberg integration scheme was used to solve the boundary value problem. The effects of the type of nanoparticle, solid volume fraction φ, Hartmann number *Ha*, Grashof number *Gr*, Eckert number *Ec*, suction/injection parameter f_w , and Biot number *Bi* on the flow field, temperature, skin friction coefficient and heat transfer rate are presented graphically and then discussed quantitatively.