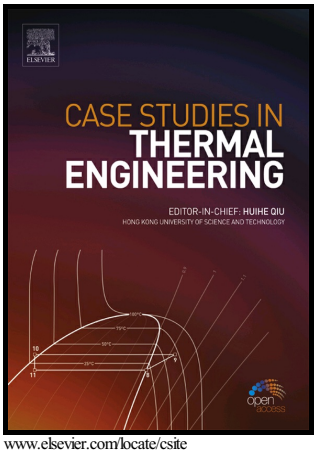


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# Nonlinear thermal radiation effect on magneto Casson nanofluid flow with Joule heating effect over an inclined porous stretching sheet

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## Abstract

In this paper, mixed convection on MHD flow of casson nanofluid over a non-linearly permeable stretching sheet has been investigated and analyzed numerically. The effects of thermal radiation, chemical reaction, heat generation/absorption, viscous dissipation, suction and Joule heating are considered. The Brownian motion and thermophoresis phenomenon are used to model nanoparticles (Buongiorno's model). After converting PDEs governing the problem to ODEs, they have been solved by Runge-Kutta Fehlberg fourth-fifth order method. Obtained results of investigating the effects of different parameters changes on velocity, temperature, and concentration profiles are reported as diagrams. Fluid flow velocity reduction by increase in Hartman number (magnetic field parameter) is due to existence of Lorentz drag force against flow, flow velocity reduction due to increase in casson fluid parameter, increase in temperature profile due to increase in radiation parameter, and nanoparticle concentration profile reduction due to increase in chemical reaction parameter are some of valuable obtained results. Also, in final section of this paper effects of different parameters on skin friction coefficient, local Nusselt and Sherwood numbers are investigated that positive and ascending behavior for all three are reported.

**Keywords:** magnetohydrodynamic (MHD), casson nanofluid, Buongiorno's model, thermal radiation, chemical reaction, heat generation/absorption, suction, Joule heating effect.