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Entropy generation in hydromagnetic nanofluid flow over a non-linear stretching sheet with Navier's velocity slip and convective heat transfer
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Abstract
The intention behind carrying out this research work is to investigate the unsteady hydromagnetic boundary layer flow of a thermally radiating nanofluid past a non-linear stretching sheet embedded in a porous medium in the presence of an externally applied magnetic field along with Navier's velocity slip. The governing partial differential equations, defining the flow regime, are transformed into a system of ordinary differential equations by employing suitable similarity transformation. Optimal Homotopy Analysis Method has been incorporated in order to solve the converted non-linear coupled equations. The impact of several regulatory flow parameters on the temperature, velocity, and nanoparticle concentration are explained via graphs, while the variation of some useful engineering quantities such as the Nusselt number, skin friction co-efficient, and Sherwood number are interpreted through tabular values. An analysis regarding entropy generation of the system is also presented. Furthermore, on the numeric data of the skin friction coefficient and Nusselt number, a linear and quadratic multiple linear regression analysis has also been performed. The findings of the present analysis reveal that the velocity slip, unsteadiness and the nonlinearity of the stretching velocity lead to a fall in the velocity profile of the nanofluid. © 2018 Author(s).

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