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Reddy, P.S., Sreedevi, P., Chamkha, A.J.

Magnetohydrodynamic (MHD) boundary layer heat and mass transfer characteristics of nanofluid over a vertical cone under convective boundary condition

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Abstract
This paper investigates the boundary layer flow, heat and mass transfer characteristics over a vertical cone filled with nanofluid saturated porous medium with the influence of magnetic field, thermal radiation and first order chemical reaction subject to the convective boundary condition. Similarity transformation technique is used for the purpose of converting non-linear partial differential equations into the system of complex ordinary differential equations. The computational Finite element method has been employed to solve the flow, heat and mass transfer equations together with boundary conditions. The impact of various pertinent parameters on hydrodynamic, thermal and solutal boundary layers is investigated and the results are displayed graphically. Furthermore, the values of local skin-friction coefficient, rate of temperature and rate of concentration is also calculated and the results are presented graphically. The comparisons with previously published work is made and found good agreement. The thickness of thermal boundary layer is increased with increase in the values of Brownian motion parameter (Nb) and thermophoresis parameter (Nt). © 2018 National Laboratory for Aeronautics and Astronautics

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