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Magneto-hydrodynamics heat and mass transfer analysis of single and multi-wall carbon nanotubes over vertical cone with convective boundary condition

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Abstract

This paper investigate the numerical study of MHD boundary layer flow, heat and mass transfer analysis of water based nanofluids containing single and multi-walled CNTs over a vertical cone embedded in porous medium with convective boundary condition under the influence of chemical reaction and suction/injection. The similarity transformation technique is used for converting the governing non-linear partial differential equations, which represents the momentum, temperature and concentration of nanofluid, into the system of coupled ordinary differential equations. The transformed conservation equations together with boundary conditions are solved by using Finite element method. The sway 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 concentration is also inspected for various values of non-dimensional parameters and the results are shown in tabular form. The numerical data results are compared with available data for special cases and found in good agreement. It is found that the skin-friction coefficient, Nusselt number and Sherwood number enhances with rising values of Biot number (B1) in both SWCNTs-water and MWCNTs-water based nanofluids. © 2017 Elsevier Ltd

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