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Abstract
Purpose - This paper aims to focus on the mathematical modeling of magnetohydrodynamic natural convective boundary layer flow of nanofluids past a stationary and moving inclined porous plate considering temperature and concentration gradients with suction effects. Design/methodology/approach - The transformed non-dimensional and coupled governing partial differential equations are solved numerically using the finite element method. Findings - The obtained numerical results for physical governing parameters on the velocity, temperature and concentration distributions are exemplified graphically and presented quantitatively. The boundary layer thickness increased with the increasing values of Soret, Dufour and Grashof numbers, while the thickness of boundary layer decreased with increasing values of suction for both stationary and moving plate cases. The primary and secondary velocity profiles are decreasing with an angle of inclination for moving plate and inclination has no significant effect for the stationary plate. An increase of the Soret number and Dufour number tend to increase the heat and mass transfer, while an increase of suction reduces the heat and mass transfer. Originality/value - The problem is an important contribution to the field of nanofluid science and technology and is relevant to high temperature rotating chemical engineering systems exploiting magnetized nanofluids. This study is relatively original in nanofluids. © Emerald Publishing Limited.

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