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Flow Analysis of Viscous Nanofluid Due to Rotating Rigid Disk with Navier's Slip: A Numerical Study

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Abstract : In this paper, the problem proposed by Von Karman is treated in the attendance of additional flow field effects when the liquid is spaced above the rotating rigid disk. To be more specific, a purely viscous fluid flow yield by rotating rigid disk with Navier’s condition is considered in both magnetohydrodynamic and hydrodynamic frames. The rotating flow regime is manifested with heat source/sink and chemically reactive species. Moreover, the features of thermophoresis and Brownian motion are reported by considering nanofluid model. The flow field formulation is obtained mathematically in terms of high order differential equations. The reduced system of equations is solved numerically through self-coded computational algorithm. The pertinent outcomes are discussed systematically and provided through graphical and tabular practices. A simultaneous way of study makes this attempt attractive in this sense that the article contains dual framework and validation of results with existing work confirms the execution of self-coded algorithm for fluid flow regime over a rotating rigid disk.

Keywords : Navier's condition, Newtonian fluid model, chemical reaction, heat source/sink
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