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Darcy-Forchheimer slip flow of Fe_3O_4–$(CH_2OH)_2$ nanofluid due to a permeable rotating disk

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Abstract: The influence of velocity slip and suction on Darcy-Forchheimer flow of $Fe_3O_4-(CH_2OH)_2$ nanofluid past stretching/shrinking rotating disk subject to convective boundary condition has been investigated in the current study. The similarity transformations are implemented to establish the non dimensional governing non linear equations. Numerical solutions of such system of equtions are developed by robust fourth order Runge Kutta method along with shooting technique. The relevant outcomes of the present study are that more and more slip peters out the tangential velocity while fluid suction undermines the radial velocity of Darcy-Forchheimer flow of $Fe_3O_4-(CH_2OH)_2$ nanofluid due to stretching/shrinking rotating disk. In addition, convective heat transfer strengthens viscous drag force and peters out heat transfer rate from the surface of both stretching and shrinking rotating disks.

Keywords: Iron oxide-ethylene glycol $[Fe_3O_4-(CH_2OH)_2]$ nanofluid; Darcy-Forchheimer flow; Velocity slip; Suction.

[Full Paper]