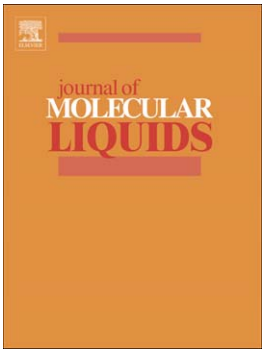

An optimal study for three-dimensional flow of Maxwell nanofluid subject to rotating frame

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An optimal study for three-dimensional flow of Maxwell nanofluid subject to rotating frame

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Abstract: Here we are concerned with optimal homotopy solutions for flow of Maxwell nanofluid in rotating frame. Flow is induced by uniform stretching of the boundary surface in one direction. Buongiorno model is adopted which features the novel aspects of Brownian diffusion and thermophoresis. Boundary layer approximations are invoked to simplify the governing system of partial differential equations. Appropriate relations are introduced to nondimensionalize the relevant boundary layer expressions. Newly suggested condition associated with zero nanoparticles mass flux at the boundary is imposed. Uniformly valid convergent solution expressions are developed by means of optimal homotopy analysis technique (OHAM). Plots have been portrayed in order to explain the role of embedded flow parameters on the solutions. Heat transfer rate at the surface has been computed and analyzed. Our findings show that the temperature and concentration fields are smaller for Newtonian fluid when compared with the upper-convected Maxwell (UCM). Moreover Brownian diffusion has mild influence of heat flux at the boundary. Viscoelastic effect has tendency to reduce heat transfer rate from the stretching boundary.

Keywords: Maxwell fluid; Rotating frame; Nanoparticles; Nonlinear analysis; OHAM.