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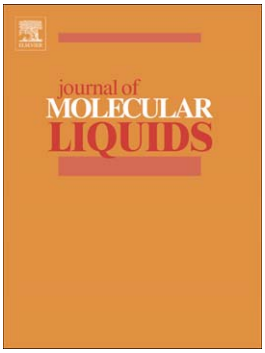

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Three dimensional rotating flow of Maxwell nanofluid

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Abstract: This article investigates rotating flow of Maxwell liquid through submersion of nanoparticles. Flow created is because of an exponentially stretching sheet. Optimal homotopic scheme is implemented for the solution of governing model. The optimal values of auxiliary parameters are computed. The optimal solution expressions of temperature and concentration of nanoparticles are elaborated via plots by employing the various values of involved parameters. The physical quantities like Nusselt and Sherwood numbers are characterized by numerical values. Here we observed that temperature of liquid and its related thickness of boundary layer arise for the increasing values of local Deborah number while it retards for larger temperature exponent parameter.

Keywords: Rotating frame; Maxwell fluid; Nanoparticles; Exponentially stretching surface; Optimal homotopy analysis method (OHAM).

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1 Introduction

Many materials in our daily usage like shampoos, soaps, apple sauce, sugar solutions, drilling muds, lubricants oils, biological and polymeric solutions etc. exhibit the characteristics of non-Newtonian liquids $[1-3]$. A simple stress and strain relation is not adequate to distinguish all the properties of non-Newtonian liquids. Various rheological formulas have been developed in the literature according to physical behavior of liquids. The mechanism of stress relaxation and retardation can be characterized by the rate type non-Newtonian models. The simplest subcategory of rate type non-Newtonian fluid model is known as Maxwell fluid. This model explored the salient features of relaxation time. In this direction, Jamil and Fetecau [4] presented an analysis to explore the flow of Maxwell liquid induced by the coaxial cylinders with shear stresses. Coupled flow of steady Maxwell liquid through mixed convection

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