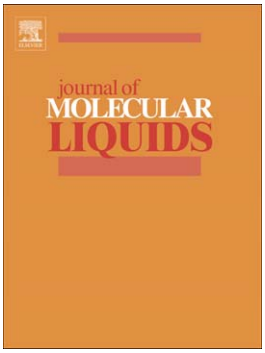

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Impact of stratification and Cattaneo–Christov heat flux in the flow saturated with porous medium

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Abstract: This article focuses on the characteristics of the viscous fluid flow over a linear stretching sheet embedded in a porous medium. Cattaneo−Christov heat flux model is used instead of classic Fourier's law of heat conduction. Governing equations for the flow problem are reduced to nonlinear ordinary equations by applying suitable transformations. The impact of various pertinent parameters on the velocity, temperature, and concentration fields are analyzed through graphs. It is analyzed that higher thermal relaxation parameter results in the reduction of the temperature field. It is perceived that for increasing values of porosity parameter, velocity field increases.

Keywords: Cattaneo−Christov heat model, upper convected Maxwell nanofluid, double stratification, stagnation point flow.

1 Introduction

It is well−known fact that the heat transfer phenomenon takes place within the same object or between two objects due to their temperature difference. During the past many years considerable attention has been devoted to heat transfer phenomenon using Fourier's law of heat conduction. Fourier's law of heat conduction results in a parabolic equation, which depicts the fact that any commence disturbance is felt suddenly through the entire medium or material. To overcome this hurdle, Cattaneo [1] incorporate thermal relaxation time in the existing Fourier's law of heat conduction, that allows the transport of heat

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