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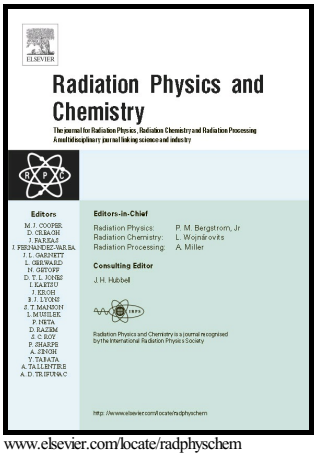

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Mixed convection and heat generation/absorption aspects in MHD flow of tangent-hyperbolic nanoliquid with Newtonian heat/mass transfer

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Abstract: This article concentrates on the magnetohydrodynamic (MHD) stagnation point flow of tangent hyperbolic nanofluid in the presence of buoyancy forces. Flow analysis caused due to stretching surface. Characteristics of heat transfer are examined under the influence of thermal radiation and heat generation/absorption. Newtonian conditions for heat and mass transfer are employed. Nanofluid model includes Brownian motion and thermophoresis. The governing nonlinear partial differential systems of the problem are transformed into a systems of nonlinear ordinary differential equations through appropriate variables. Impact of embedded parameters on the velocity, temperature and nanoparticle concentration fields are presented graphically. Numerical computations are made to obtain the values of skin friction coefficient, local Nusselt and Sherwood numbers. It is concluded that velocity field enhances in the frame of mixed convection parameter while reverse situation is observed due to power law index. Effect of Brownian motion parameter on the temperature and heat transfer rate is quite reverse. Moreover impact of solutal conjugate parameter on the concentration and local Sherwood number is quite similar.

Keywords: Tangent hyperbolic nanofluid; magnetohydrodynamic (MHD); stagnation point flow; thermal radiation; heat generation/absorption; Newtonian heat and mass conditions.

1 Introduction

The investigation on dynamics of non-Newtonian liquid is a subject of abundant research due their enhancing importance in process and chemical processes. Examples of such liquid may include clay-coating points, grease, custard, suspensions, shampoos, coal-oil slurries, cosmetic products and many others. Some physiological examples of these fluids are synovial fluid

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