عنوان مقاله:

An Impact of Induced Magnetic and Cattaneo-Christov Heat Flux Model on Nanofluid Flow across a Stretching Sheet

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نویسندگان:

K.M. Nihaal - Department of Studies in Mathematics, Shivagangotri, Davangere University, Davangere, India

U.S. Mahabaleshwar - Department of Studies in Mathematics, Shivagangotri, Davangere University, Davangere, India

L.M. Pé rez - Departamento de FÍsica, FACI, Universidad de Tarapacá, Casilla ٧D, Arica, ١٠٠٠٠٠٠, Chile

P. Cattani - Department of Computer, Control and Management Engineering, University of Rome "La Sapienza", Via Ariosto ٢٥, ٠٠١٨٥ Roma, Italy

خلاصه مقاله:

The induced magnetic field is used to control the fluid motion and heat transfer in a variety of applications, such as in MHD devices, microfluidics, electrically conducting fluids in channels and in circular pipes, and clinical applications such as drug delivery and cooling of nuclear reactors. Henceforth this investigation aims to elucidate the behavior of viscoelastic (second-grade fluid) ternary nanofluid flow through a permeable stretching sheet with an induced magnetic field. The stretching surface is subjected to the Cattaneo-Christov heat and mass flux model to investigate heat and mass transfer properties. Solutions of reduced governing equations are obtained numerically via the shooting method and computed using the bvp-٤c algorithm. The impacts of diverse active parameters such as porous medium, magnetic parameter, reciprocal magnetic Prandtl parameter, stretching parameter, HSS parameter, and relaxation time parameter for heat and mass flux are studied graphically. In addition, the values of significant engineering factors are calculated and comparative analysis is presented through bar graphs. It is seen that regular heat sink/source promotes thermal distribution and relaxation time for mass flux enhances the mass transfer rate between fluid flow and solid surface.

کلمات کلیدی:

Ternary nanofluid, Porous medium, Heat source/sink, Induced magnetic field, Modified Cattaneo-Christov model