

عنوان مقاله:

Viscoelastic Micropolar Convection Flows from an Inclined Plane with Nonlinear Temperature: A Numerical Study

محل انتشار:

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نویسندگان:

S. Abdul Gaffar - *Department of Information Technology, Mathematics Section, Salalah College of Technology, Salalah - ۲۱۱, Oman*

P. Ramesh Reddy - *Department of Mathematics, Madanapalle Institute of Technology & Science, Madanapalle - ۵۱۷۳۲۵, India*

V. Ramachandra Prasad - *Department of Mathematics, School of Advanced Sciences, Vellore Institute of Technology, Vellore - ۶۳۲۰۱۴, India*

A. Subba Rao - *Department of Mathematics, Madanapalle Institute of Technology & Science, Madanapalle - ۵۱۷۳۲۵, India*

خلاصه مقاله:

An analytical model is developed to study the viscoelastic micropolar fluid convection from an inclined plate as a simulation of electro-conductive polymer materials processing with nonlinear temperature. Jeffery's viscoelastic model is deployed to describe the non-Newtonian characteristics of the fluid and provides a good approximation for polymers. Micro-structural is one of the characteristics of non-Newtonian fluid that represents certain polymers, which constitutes a novelty of the present work. The normalized nonlinear boundary value problem is solved computationally with the Keller-Box implicit finite-difference technique. Extensive solutions for velocity, surface temperature, angular velocity, skin friction, heat transfer rate and wall couple stress are visualized numerically and graphically for various thermophysical parameters. Validation is conducted with earlier published work for the case of a vertical plate in the absence of viscous dissipation, chemical reaction and non-Newtonian effects. This particle study finds applications in different industries like reliable equipment design, nuclear plants, paint spray, thermal fabrication, water-based gel solvents, polymeric manufacturing process, gas turbines and different propulsion devices.

کلمات کلیدی:

Viscoelastic fluid, Micropolar Fluid, Nonlinear Temperature, Retardation time, Vorticity

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