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# Magnetohydrodynamic Flow of Viscoelastic Nanofluid and Heat Transfer over a Stretching Surface with Non-Uniform Heat Source/Sink and Non-Linear Radiation

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**Abstract :** In this paper, an analysis has been made on the flow of non-Newtonian viscoelastic nanofluid over a linearly stretching sheet under the influence of uniform magnetic field. Heat transfer characteristics is analyzed taking into the effect of nonlinear radiation and non-uniform heat source/sink. Transport equations contain the simultaneous effects of Brownian motion and thermophoretic diffusion of nanoparticles. The relevant partial differential equations are non-dimensionalized and transformed into ordinary differential equations by using appropriate similarity transformations. The transformed, highly nonlinear, ordinary differential equations are solved by spectral local linearisation method. The numerical convergence, error and stability analysis of iteration schemes are presented. The effects of different controlling parameters, namely, radiation, space and temperature-dependent heat source/sink, Brownian motion, thermophoresis, viscoelastic, Lewis number and the magnetic force parameter on the flow field, heat transfer characteristics and nanoparticles concentration are examined. The present investigation has many industrial and engineering applications in the fields of coatings and suspensions, cooling of metallic plates, oils and grease, paper production, coal water or coal–oil slurries, heat exchangers' technology, and materials' processing and exploiting.

**Keywords :** magnetic field, nonlinear radiation, non-uniform heat source/sink, similar solution, spectral local linearisation method, Rosseland diffusion approximation
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