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Investigation of heat transfer for silver oxide (Ag_2O) and iron oxide (Fe_3O_4) using nano fluid over a stretch sheet

MR. Rashmi [a,*], Ramesh Kola [b], Manoj Kumar [c], Kumar Pratyush [d], Priya Dule [e], GA. Sivasankar [f]

[a] Department of Mathematics, Mangalore Institute of technology and Engineering BadagaMijar, Mangaluru 574225, Karnataka, India
[b] Department of Chemistry, Chaitanya Bharathi Institute of Technology (A), Gandipet, Hyderabad 500075, Telangana, India
[c] Department of Mechanical Engineering, Guru Gobind Singh Educational Society's Technical Campus, Chas 827013, Jharkhand, India
[d] Department of Pharmaceutical Chemistry, SVKM's Institute of Pharmacy, Dhule 424001, Maharashtra, India
[e] Department of Pharmaceutical Chemistry, Gangamai College of Pharmacy, Nagaon 424004, Dhule, India
[f] Department of Aeronautical Engineering, KIT - Kalaignar Karunanidhi Institute of Technology, Kannampalayam 641402, Tamil Nadu, India

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ABSTRACT

The effect of velocity and convective heat transfer environments along with hybridized nano-fluid moving across irregular curved surface was examined in this article. A hybrid nanofluid and silver oxide Ag_2O, as well as an iron oxide Fe_3O_4 based nanofluid, were also examined. The governing model was used to generate a nonlinear ordinary differential equations. By using this, we employed the similarity transformation technique. Shooting approach with Runge-Kutta technique of order 4 (RK-4), which is a higher-order numerical approximation methodology was used to find the solution of modified ordinary differential equations system (RK-4). Fluid velocity is lowered by magnetic, curvature and slip property, while temperature was reduced by convective heat transfer, Prandtl number, and magnetic property values. Skin fraction, Nusselt number and other physical quantities of interest to engineers are discussed. These behaviors are graphically depicted alongside the numerical values, in contrast to earlier work in a tabular format with numbers.

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1. Introduction

Newtonian and non-Newtonian fluids distinguish boundary layer fluxes. The stress–strain relationship in Newtonian fluids is linear. Non-Newtonian fluid boundary layer flows have attracted much more consideration for their diverse range of application in industry, manufacturing and geothermal engineering [1]. Nuclear reactors, metallurgical activities, fibre spinning, casting, crystal formation, and a wide range of other applications are among them. Non-Newtonian fluid models cannot be described in a single link due to their reciprocal features [2]. On exponentially and linearly increasing surfaces, authors [3] examined boundary layer flow. Researchers [4] looked into the Navier-Stokes equation's parallel analysis on a stretched surface. The researchers from [5–7] discovered time-based boundary layer flow on a penetrable curved shrinking/stretched surface. The parameters of similar and dissimilar responses on flow of boundary layers on a stretch curve sheet are explored by [8–9]. Researchers from [10] and [11] examined the influence of temperature-based conductance on boundary layer fluid and transmission of heat through a curve stretched sheet. The authors [12–13] demonstrated a non-Newtonian fluid on exponentially curve stretched surface along with magnetic field. Researchers from [14–16] examined the reliable method of determining an transmitting electrical micropolar fluid on a curve stretched sheet. According to [17], *n*-fluid increases the thermo-physical factors of *n*-fluid at first. In comparison to the base fluid and found that thermo-physical parameters such as heat conductivity, heat diffusivity, fraction of volume for *n*-elements, convective heat as well as viscosity support to the nano-fluid. Moreover, as shown in a number of authors have described the characteristics of nanoparticles in a variety of fluid models. Researchers from [18–19] first proposed a hybrid nano-fluid containing $Cu + Fe_3O_4/H_2O$ and Cu/H_2O. Researchers from [20] used inverted cone to demonstrate properties of a CuAg/water mixed *n*-fluid along with convective heat transfer. Authors of [21–23] established a solution for

* Corresponding author.
E-mail address: rashminitk@gmail.com (MR. Rashmi).

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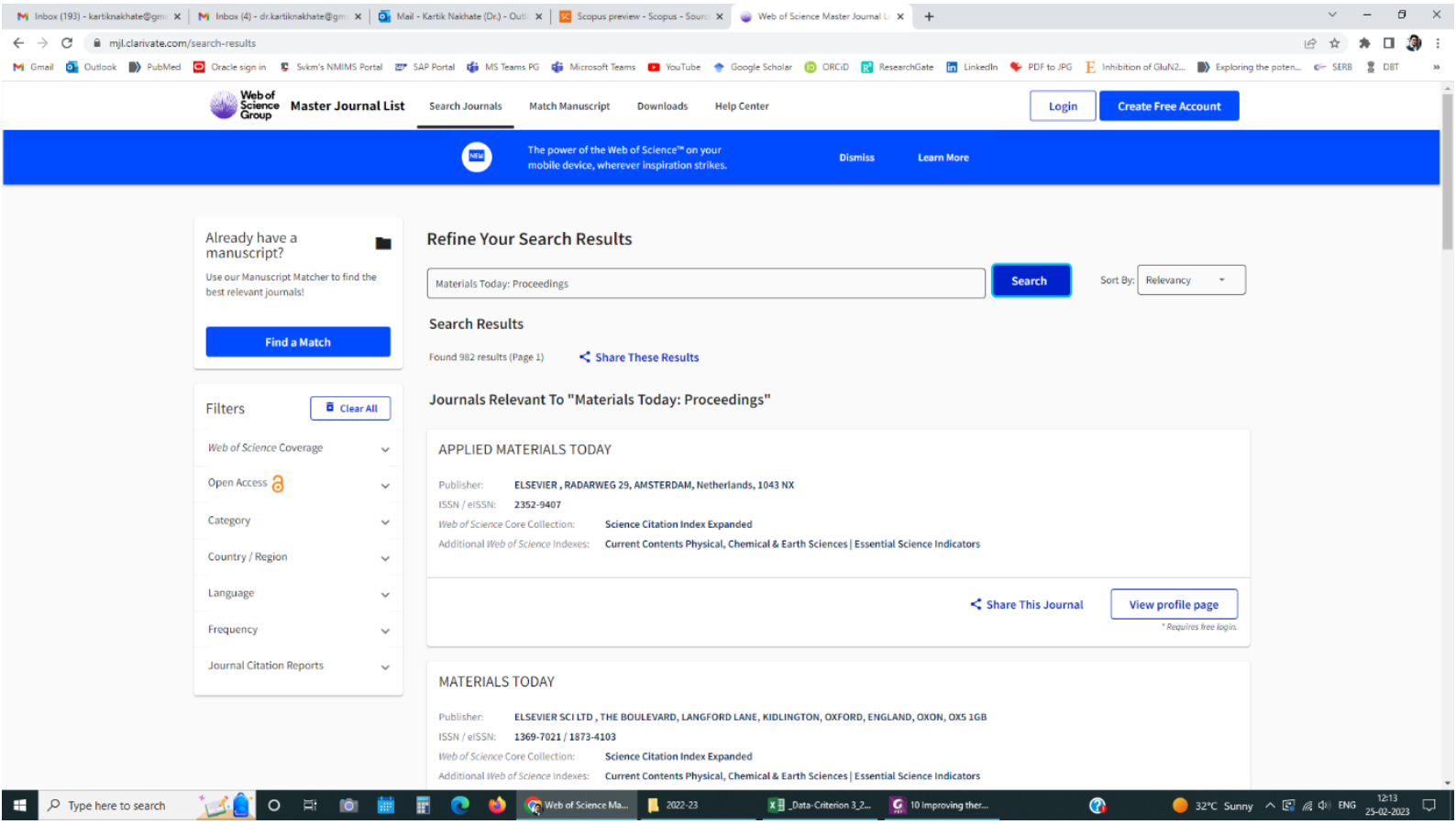
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