ISBN: 978-93-5437-197-4

Aligned magnetic field effect on unsteady natural MHD convection flow of a chemically reacting, radiative and dissipative fluid past a porous vertical plate in the presence of continuous heat and mass flux

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***Abstract*—ThiselecThe slip flow effects on unsteady hydromagnetic flow over a stretching surface with thermal radiation are studied in the presence of heat generation and porous media. The governing partial differential equations are reduced to a system of self-similar equations, using transformations of similarity.The resulting equations are then numerically solved using the fourth-order technique of Runge-Kutta and the shooting method. The effects on velocity and temperature of regulating physical parameters are measured and described in graphical and tabular ways, as well as the coefficient of skin friction and Nusselt number.**

Numerical computations have been carried out for different parameter values, such as the magnetic interaction parameter. (M^2)**, in order to evaluate the results Permeability of porous medium parameter *(K),* Heat generation parameter *(Q),* Unsteadiness parameter *(A),*Radiation parameter *(R),* Velocity slip parameter (** h_1 **), Thermal jump parameter (** h_2 **) and Prandtl number *(Pr).*With the help of figures and graphs, the results and numerical values are clarified. Also derived and discussed are the Skin Friction and Nusselt Number expressions.**

Keywords—A chemically reacting, radiative and dissipative fluid heat and mass flux, aligned magnetic field, MHD normal convection flow

I. INTRODUCTION

This induces magnetic fields by changing electrical charges and intrinsic magnetic moments of elementary particles related to their fundamental quantum property, their spin. In relativity, electric and magnetic fields are two interrelated aspects of a single entity, namely the electromagnetic tensor.Depending on the relative velocity of the charge and the observer, the division of the tensor into electric and magnetic fields. In quantum mechanics, the electromagnetic field is quantized and electromagnetic interactions arise from the exchange of photons. Raja Shekar and Karunakar Reddy [1] examined heat and mass transfer past a continuously moving porous boundary in the presence of a magnetic field.Sun et al.[2]studied heavy segregation and self-assembly induced by strong magnetic fields of micrometer-sized non-magnetic particles. Raja Shekar and Karunakar Reddy[3] explored heat and mass transfer past a continuously moving porous boundary in the presence of a magnetic field. The effects of radiation and variable viscosity on a free MHD convection flow past a semi-infinite flat plate with an aligned magneticfield were studied by Seddeek[4] in the case of unsteady flow. A chemical reaction is a procedure that results in one category of chemical substances being converted to another. Chemical reactions generally include changes that include only electron positions in the formation and breakdown of chemical bonds between atoms, without nucleus modification, and can usually be represented by a chemical equation. Chemical science can be a sub-discipline of chemistry involving the chemical reactions of elements in which electronic and nuclear modifications may take place that are unstable and radioactive.Krishna et al. [5] considered the effects of chemical reaction and radiation on MHD convective flow overa permeable stretching surface with suction and heat generation. In the presence of the heat source/sink for Soret and Dufour effects on free convective heat and mass transfer with thermophoresis and chemical reaction over a porous stretching surface, .Kandasamy et al.[6] acquired group theorytransformation. Ravikumar et al.[7] Joneidi et al.[8] investigated MHD double diffusive and chemically reactive flow through porous medium bounded by two verticalplates.[8] developed MHD free convective flow analytical treatment and mass transfer over a stretching board of chemical reactions.The effect of a chemical reaction on transient MHDfree convection flow over a vertical plate was acquired by Sahin[9] in slip-flow mode. Chamkha et al.[10] explored Unsteady MHD natural convection from a heated vertical porous plate in a micro-polar fluid with chemical reaction, heating effects of Joule, and radiation. Mohamed et al.[11] have recorded unstable MHD double-diffusive convection boundary-layer flow past a radiating hot vertical surface in porous media in the presence of chemical reaction and heat sink. The release or transmission of radiation across space or through a tissue medium in the form of waves or particles is radiation in physics.This includes electro-magnetic radiation such as radio waves, actinic rays, and x-rays, particle radiation such as alpha, β, and neutron radiation, and acoustic radiation such as vibration, ultrasound, and seismic waves. Radiation may also apply to the electricity, waves, or particles being radiated. Rajput and Kumar[12, 13] investigated radiation effects on MHD flow past a vertical plate with impulsively initiated variable heat and mass transfer. The influence of radiation on free-convection flow in a spinning fluid past an impulsively initiated vertical plate was discussed by Vijayalakshmi[14].Muthucumaraswamy and Janakiraman[15] studied MHD and radiation effects with variable mass diffusion on the moving isothermal vertical plate. Thermal radiation and magneto hydrodynamic effects on heat and mass transfer of chemically reactive fluid with periodic suction were obtained by Ahmedsahin and Tridip [16]. Pal and Talukdar[17] have studied perturbation study of unstable magneto hydrodynamic convective heat and mass transfer through a vertical permeable plate with thermal radiation and chemical reaction in a boundary layer slip flow.

Ahmedsahin and Tridip [16] obtained thermal radiation and magneto hydrodynamic effects on heat and mass transfer of chemically reactive fluid with periodic suction. Pal and Talukdar[17] researched the perturbation analysis of unstable