TURKU HANSDA LAPSA HEMRAM MAHAVIDYALAY

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Criterion 3 - Research, Innovations and Extension

3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during the last five years

Research Papers Published in Research Journals
Session 2019-2020

TURKU HANSDA LAPSA HEMRAM MAHAVIDYALAY

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3.3.1 Number of research papers published per teacher in the Research Journals

Session- 2019-2020

Sl No	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Calendar Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal /Digital Object Identifier (doi) number		
							Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
1	Convective-radiative double-diffusion heat transfer in power-low fluid due to a stretching sheet embedded in non-Darcy porous media with Soret-Dufour effects	Dulal Pal & Sewli Chatterjee	Mathematics	International Journal for Computational Methods in Engineering Science and Mechanics	2019	1550-2287(P) 1550-2295(O)	https://www.tandfonline.com/loi/ucme20	http://doi.org/10.1080/15502287.2019.1631406	Peer Revived

13/07/24

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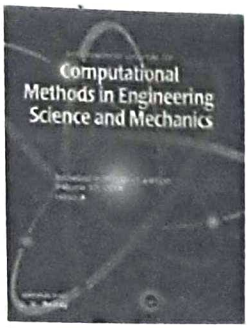

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Convective-radiative double-diffusion heat transfer in power-law fluid due to a stretching sheet embedded in non-Darcy porous media with Soret–Dufour effects

Dulal Pal & Sewli Chatterjee

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Convective-radiative double-diffusion heat transfer in power-law fluid due to a stretching sheet embedded in non-Darcy porous media with Soret–Dufour effects

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ABSTRACT

A numerical model is developed to study the combined effects of Soret and Dufour on mixed convection heat and mass transfer in a Power-law fluid saturated with Darcy–Forchheimer porous medium in the presence of nonlinear thermal radiation, chemical reaction and Ohmic dissipation. The governing boundary layer equations are solved numerically by using shooting method with Runge–Kutta Fehlberg integration scheme. The influence of Soret and Dufour numbers, chemical reaction, thermal Grashof number and solutal Grashof number on velocity, temperature and concentration fields are studied. The effects of some important physical parameters on skin-friction, Nusselt number and Sherwood number are studied in detail.

KEYWORDS

Thermal radiation; magnetohydrodynamics; porous medium; Power-law fluid; Soret and Dufour numbers; heat transfer

1. Introduction

The studies on convective heat and mass transfer in a Power-law fluid over a stretching surface embedded in a porous medium has received great attention in recent past because of its wide applications in energy-related problems that includes both metal and polymer sheets. Convective flows along with heat and mass transfer in the presence of chemical reaction arise in many transport processes in various branches of science and engineering. This phenomenon plays an important role in the chemical industry, power and cooling industry, cooling of nuclear reactors, and petroleum industries. Also, it occurs in the aerodynamic extrusion of polymer sheets, thermal energy storage, continuous filament extrusion from a dye, cooling of an infinite metallic plate in a cooling bath. In all these technologies, the quality of the final product depends greatly on the rate of heat and mass transfer at the stretching surface. Andersson et al. [1] studied magnetohydrodynamic flow of a power law fluid over a stretching sheet. Chamkha et al. [2] analyzed the effects of chemical reaction on unsteady natural convective power-law fluid flow past a vertical plate embedded in a non-Darcian porous medium. Pal et al. [3] examined combined effects of nonlinear thermal radiation on heat and mass transfer in a thin liquid film on a permeable unsteady stretching surface with convective boundary condition in the presence of internal heat generation/absorption. Srinivasacharya and Reddy [4] investigated the influence of thermal radiation and chemical reaction effects on mixed convection heat and mass transfer of power-law fluid saturated porous medium over a vertical plate.

The effect of Soret and Dufour were neglected in the above studies. When heat and mass transfer occur simultaneously in a moving fluid the relation between the fluxes and driving potentials are of a more intricate nature. Moreover, from Fourier's law we have a relationship between energy flux and temperature gradient, i.e. Fick's law is applied for the correlation of mass flux and concentration gradient. Thus, energy flux can be generated not only by temperature gradient but also by a concentration gradient. The energy flux due to the composition gradient is known as the Dufour or diffusion-thermo effect. The mass transfer created by the temperature gradient is called as Soret or thermal diffusion effect. Soret and Dufour effects have a great importance for the fluids of very light molecular weight and of medium molecular weight which cannot be neglected. Mondal et al. [5] investigated the influence of thermophoresis and Soret

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