



Bioconvection analysis for convectively heated radiative flow of Sutterby fluid involving efficacy of ferromagnetic nanoparticles

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ABSTRACT

In this article explained about the study 2-D Sutterby fluid model with suspension of microorganisms in ferrofluid, while radiation aspect is also considered here. Basic purpose of using microorganism is to obtain more stability in suspension. Here the important characteristics of thermophoresis parameter, viscous dissipation, magnetic interaction parameter and Brownian motion parameter are examined. Now, the system of non-linear P.D.Es is changed into set of O.D.Es then we solved these equations by using famous mathematical scheme bvp4c. Graphical results showed that temperature of Sutterby ferrofluid intensifies with increase in the estimations of thermal Biot number as well as radiation effects whereas results in reduction of Prandtl number. The density of microorganism reduces for greater values of Peclet number.

Introduction

Recently, many researcher working on the demand of energy is increasing continuously, while the traditional nonrenewable resources of energy are declining day by day so it is a severe threat for policy makers to search some better alternative sources of energy. There are two basic factors for demand of energy on larger scale, first one is growing human population and industrialization, second one is environmental pollution as well as problem of global warming caused by traditional nonrenewable resources. Policy makers and researchers are trying to solve the energy crisis in the world, their basic aim is to explore some innovative renewable sources of energy that can overcome the problems we discussed earlier so one of such most favorite and innovative source of energy is solar energy which is not only pollution free source but also it is found abundant in nature. Some most common non-renewable sources of energy are wind energy, tidal energy and energy from sun, from these sources solar energy is considered most promising one. There is a variety of solar energy applications in multiple fields including solar heating system, modern telecommunication system, manageable solar systems, advanced refrigeration system, solar energy

used in educational institutes, advanced wireless system, working of modern down cameras, to heat up swimming pools water, modern air conditioners working on solar energy, advanced engineering processes, working of advanced remote sensing system, operating of advanced satellite system, working of solar electric bikes, solar based mobile charging system, solar powered system for irrigation of agriculture, street lights working on solar energy, transportation system based on solar energy, advanced data centers working on basis of solar energy, disaster management centers working on solar energy as well as food drying/storage process. Researchers found that economic development of any country is directly associated with different resources of energy utilized in daily life applications. Undoubtedly it is main focus of researchers to promote the renewable sources of energy but till now there is no major achievement for promotion of renewable energy practically. According to latest data till now renewable energy cover only round about 27 % of total global energy while rest of 73 % are still covered by non-renewable energy. The scientists are trying reduce the trend of non-renewable energy because of many reasons but major reasons are future threats for shortage of existing fossil fuels and increasing anxiety of climate change as well as environmental adverse effects of non-renewable energy. Solar energy is mostly preferred upon other

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