Analysing Chemotaxis Bio convection in a Swirling Oldroyd-B Fluid Flow with Soret and Dufour Effects

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1 INTRODUCTION AND OBJECTIVE

The main focus of this investigation is to study the dynamics of the chemotaxis mechanism in the context of bio convection occurring in a fluid that is set in motion by the swirling movement of a flexible heated cylinder. The cylinder's motion involves a combination of constant rotation and axial-dependent stretching [1]. In this study, the cylinder moves through stretching with axially dependent rotation. Here, the temporal relaxation phenomena are taken into account together with the nonlinear viscoelastic fluid. In addition, the fluid also has gyrotactic micro-species in it. The Soret-Dufour hypothesis is used in energy transportation analysis to examine the effects of heat and concentration gradients on the solute and thermal transmission of energy, respectively. In the flow present problem, the magnetic field is used as an external constraint. The results of the current issue are shown graphically and discussed in terms of actual application. To further complicate the system, an external magnetic field is applied, which acts as an additional constraint in the flow problem [2]. The governing equations for this problem are nonlinear differential equations, which are solved using the bvp5c function.

2. RESULTS AND HIGHLIGHTS

The results of this investigation are presented in graphical forms and are explained with practical implementation in mind. Each outcome of the study highlights the influence of non-dimensional parameters on flow, energy, and bio-convection phenomena.

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REFERENCES

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