Abstract

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Peristaltic Flow with Heat Transfer for Nano-Coupled Stress Fluid through Non-Darcy Porous Medium in the Presence of Magnetic Field

In this paper, the peristaltic motion of nano-coupled stress fluid through non-Darcy porous medium is investigated, and the heat transfer is taken into account. The system is stressed by an external magnetic field. The Ohmic and viscous couple stress dissipations, heat generation and chemical reaction are considered. This motion is modulated mathematically by a system of nonlinear partial differential equations, which describe the fluid velocity, temperature and nanoparticles’ concentration. These equations are transformed to non-dimensional form with the associated appropriate boundary conditions. The homotopy perturbation method is used to find the solutions of these equations as a function of the physical parameters of the problem. The effects of the parameters on the obtained solutions are discussed numerically and illustrated graphically. It is found that these parameters play an important role to control the solutions. Significant outcomes from graphical elucidation envisage that the inclusion of more magnetic field strength increases the resistance of the fluid motion. Intensification of the couple stress parameter attenuates the temperature values, while it increases with increasing thermophoresis parameter.