Abstract

Adel M. Elrefaey

Joint Effect of Magnetic Field and Heat Transfer on Particulate Fluid Suspension in a Catheterized Wavy Tube

The effect of wall slip conditions, porous media, and heat transfer on peristaltic inflow of MHD Newtonian fluid with suspended particles in a catheterized tube has been studied with long-wavelength and low-Reynolds number approximations. The analytical solution has been derived for velocity and temperature. The amplitude ratio, particle concentration, catheter size, and the dimensionless flow rate were used to discuss the pressure gradient. The solutions for velocity and temperature derived in the analysis have been computed numerically and investigated. The tube surface is maintained at a fixed temperature. The variations of physical variables with the pertinent parameters were discussed graphically. The mathematical model presented corresponds to the flow in the annular space between two concentric tubes. It has been deduced that the thermal energy is reduced with particles' concentration and with slip condition through the catheterized tube. The flow accelerates with the magnetic field and slip condition at the wall, whereas it decreases at the catheter. The catheter size has a different effect on both pressure and friction force.