ABSTRACT

In this thesis, we study four problems for non-Newtonian fluids in the different geometries.

In the first problem, we study two cases, in the first case the steady MHD flow of an incompressible viscous non-Newtonian power law fluid above an infinite rotating porous disk with heat transfer. A uniform magnetic field is applied perpendicularly to the plane of the disk and a uniform injection or suction is applied through the surface of the disk. Numerical solutions of the nonlinear differential equations which govern the hydromagnetic and heat transfer are obtained. The effects of characteristics of the non-Newtonian fluid, the magnetic field parameter and the suction or injection velocity on both the velocity and temperature distributions are considered. In the second case the steady flow through a porous of an incompressible non-Newtonian power law fluid over an infinite rotating disk with heat transfer is studied. The disk is maintained at a constant temperature and the viscous dissipation is taken into consideration. The finite difference method is used to solve the governing equations. The effect of the porosity of the medium and the non-Newtonian fluid characteristics on the velocity and temperature distributions is considered.