

ON STUDY OF UNSTEADY MOTION OF NEWTONIAN AND NON-NEWTONIAN FLUIDS WITH EXTERNAL FORCES THROUGH POROUS MEDIUM

ABSTRACT

Chapter (I):

In chapter (I), we presented an introduction about the following topics

- 1) Newtonian and non-Newtonian fluids, 2) Classification of non-Newtonian fluids
- 3) Magnetohydrodynamics, 4) Flow through porous medium
- 5) Couple stress in fluid, 6) Peristaltic motion
- 7) Basic equations, 8) Some previous studies

Chapter (II)

In chapter (II), we investigated the analytical solutions of the momentum and energy equations which governing the unsteady motion of non-Newtonian fluid of second grade type through a Darcian porous medium. The motion is confined between two infinite parallel plates in the presence of an external magnetic field. The perturbation Technique is used to obtain the solutions of the system of partial differential equations. The effects of the physical parameters of the problem on the analytical formula of the velocity and temperature as well as the skin friction and the rate of heat transfer are discussed and illustrated graphically through a set of figure.

Chapter (III)

In chapter (III), we studied the unsteady flow with heat transfer of a non-Newtonian fluid of second grad type through a Darican porous medium between two infinite parallel plates with couple stresses. The system is stressed by an external magnetic field. The analytical solutions of the momentum and the energy equations are obtained by using the perturbation technique. The effect of the magnetic parameter, the permeability parameter and couple stress parameter on the velocity components and the temperature distributions as well as the skin friction and rate of heat transfer are discussed and illustrated graphically through a set of figures.

Chapter (IV)

This chapter is devoted to study the peristaltic motion of non-Newtonian fluid with heat and mass transfer through a porous medium in channel under the effect of magnetic field. A modified Casson non-Newtonian constitutive model is employed for the transport fluid. A perturbation series method of solution of the stream function is discussed. The effects of various parameters of interest such as the magnetic parameter, Casson parameter and permeability parameter on the velocity, pressure rise, temperature and concentration are discussed and illustrated graphically through a set of figures