

ABSTRACT

In this dissertation, we consider an unsteady unidirectional third grade fluid in a porous medium with porous boundary. Modified Darcy's law is introduced to incorporate the effects of pores in a porous media. A strong magnetic field is applied, which acts perpendicular to the velocity field, usually known as the Hall effects. We further assume that there is a slip between the boundary and the third grade fluid in contact with the plane boundary. The heat transfer analysis with regard to the modified Darcy's law is also discussed. The nonlinear governing equation with superimposed suction/blowing and velocity amplitude at the boundary is solved by applying perturbation technique in the third grade parameter. In this way three linear systems are obtained and solved by separating the variables. In order to obtain the physical interpretation the graphs are plotted in which the effects at the boundary and in the flow region are examined. Mainly the effects of magnetic field, Hall parameter, second and third grade parameters, porosity parameter and suction/blowing parameter are observed and then compared to the results already available in the literature.