Abstract of the Thesis

In this thesis, the aim of the investigation of two-dimensional steady and unsteady MHD flow of different kind of fluids over stretching sheet or non-linear stretching sheet. Using Homotopy analysis method (HAM), solutions of the problems have been found and discussed. Fundamentals and applications of MHD fluid flow, mathematical models of Williamson fluid, Carreau fluid, and Micropolar fluids effects of heat and mass transfer, radiation, heat generation and absorption, Joule heating, viscous dissipation, Soret and Dufour effects, linear and nonlinear stretching sheets are all covered in this thesis. A review of pertinent literature has been done.

Entropy optimization is used to enhance the system performance. MHD fluid flow research is important because it has numerous engineering applications. For example, slurry flows, industrial oils, diluted polymer solutions. effects of magnetic field and radiation are studied on Entropy optimized MHD fluid flow in presence of joule heating, heat generation/absorption and viscous dissipation impact with slip condition and convective boundary condition have been discussed in the thesis. Solutions of the Problem found by HAM. Further, this work is extended to analyse mass transfer of entropy optimized MHD fluid flow by applying nonlinear radiation. Applications of Williamson fluid in engineering encourage to analyse the behaviour of steady flow of MHD Williamson fluid over a stretching sheet considering viscous dissipation and nonlinear radiation. Also, this work is extended considering unsteady flow of entropy optimized Williamson fluid considering Joule heating and nonlinear radiation. Slip effects and Convective boundary conditions taken into account. MHD Carreau fluid flow over a nonlinear stretching sheet with varying viscosity have been discussed in this thesis. Unsteady flow of Micropolar fluid considering stretching sheet considering chemical reaction have been studied in the thesis. Extend the work of MHD flow, Electromagnetohydrodynamics (EMHD) flow has been consider. Analysis of EMHD flow of Micropolar fluid over a stretching sheet with viscous dissipation and slip effects have been done in the thesis. Effects of various pertinent parameters on velocity, temperature and concentration have been discussed through graphs. Physical measures also discussed.