CHAPTER 7

CONCLUSION

Conclusions of the investigations based on various parameters of the research work are presented in this chapter. Contributions of the investigations are highlighted in the section 7.1 and section 7.2 presents the major conclusion of the investigations. The scope for further research has been detailed in section 7.3.

7.1 CONTRIBUTIONS OF PRESENT WORK

Runge-Kutta Gill method along with the shooting technique is applied for a steady two dimensional free convective flow of heat and mass transfer and coded through a programming approach using Fortran 7.7. The dependability of the computer code has been verified and validated by comparing the results obtained with those available in the literatures.

Approximate numerical solutions are presented for boundary layer flow and heat transfer over a continuous surface in the presence of hydromagnetic field with viscous dissipation and Joule heat transfer for an electrically conducting fluid past a continuously moving plate using Runge-Kutta Gill method together with the shooting technique.

The combined effect of heat generation, viscous dissipation steady free convection flow of heat and mass transfer over an exponentially stretching surface in presence of radiation, advocated in this research work

have shown good results in terms of velocity profile, temperature profile and concentration profile.

Finally, the effects of chemical reaction, thermal radiation, internal heat generation on chemically reacting MHD boundary layer flow of heat and mass transfer past a moving vertical plate with suction/injection have also been studied.

7.2 MAJOR CONCLUSIONS

- The velocity decreases with the increase of power law index of the surface temperature variation (exponent) and the magnetic parameter
- The temperature decreases with the increase of the power law index of the surface temperature variation (exponent) and the magnetic parameter.
- The heat transfer rate increases rapidly with the increase of power law index of the surface temperature variation (exponent) whereas when the magnetic parameter increases the heat transfer rate decreases.
- The velocity decreases with an increase in the magnetic parameter and permeability parameter.
- A positive increase in Prandtl number is shown to reduce the velocity and temperature in the flow.
- The temperature decreases with an increase in magnetic parameter and permeability parameter.
- An increase in M and K leads to fall in the skin-friction coefficient but there is an increase in Nusselt number

- The surface shear stress increases with the magnetic parameter M, while the heat transfer rate increases with Prandtl number Pr, but decreases with both magnetic parameter M and radiation parameter K.
- An increase in Sc or n leads to a fall in the concentration and a rise in the value of the Sherwood number.
- The fluid velocity within the boundary layer decreases with increasing the magnetic strength and wall suction, and increases with wall injection.
- An increase in the wall suction enhances the boundary layer thickness and reduces the skin friction together with the heat and mass transfer rate at the moving plate surface.
- The chemical species concentration within the boundary layer decreases with increasing Gc, Gr, Sc and α.

7.3 SCOPE FOR FUTURE WORK

The study in this thesis is limited to the magnetic field applied along y axis. However the effect of application of Magnetic field in all other directions and the variation in the thermo physical parameters may also be studied.

The coupled non-linear partial differential equations are transformed into a set of simultaneous non-linear ordinary differential equations, which are integrated by using Runge-Kutta Gill algorithm together with the shooting technique. Other techniques like Finite element method, sixth order Runge-Kutta method, Finite difference method and Finite volume method may be extended to study the above problem. The analytical solution for these problems may be obtained by Integral transform technique.