Summary and Conclusion

The main focus of this thesis is on numerical solutions of reduced system of ODEs of Stratified Boussinesq Equations. The thesis comprises seven chapters including a Summary and Conclusion.

In chapter 1, an introductory idea of this thesis has been given.

In chapter 2, the historical background, definitions and some relations that were of great concern with the study of Stratified Boussinesq Equations were discussed. This chapter was made self contained through defining the elementary concepts such as reduction of system of coupled nonlinear ODEs.
In chapter 3, the initial surface satisfying first four integrals has been evaluated. Also, it was noticed that the results which are obtained by Modified Euler Method, are accurate up to $10^{-20}$. The error in $\theta$ and $\phi$ depends on the step size '$h$' and can be reduced by decreasing the step size. The results obtained are very accurate and the error is also bounded.

In chapter 4, the numerical solutions of system of coupled nonlinear ODEs by Runge-Kutta fourth order method were obtained. Also the exact solutions and numerical solutions were compared. The results obtained by Runge-Kutta fourth order method are of order $10^{-20}$ for $\phi$ and $10^{-14}$ for $\theta$. The error in numerical solution can be reduced by reducing step size ($h$).

In chapter 5, the Adomian Decomposition Method is used for obtaining the solution of system of six coupled nonlinear ODEs. This method is implemented using the software MATHEMATICA 9. The errors in numerical solutions are calculated. The minimum error is $10^{-11}$ and the maximum error is $10^{-6}$. The convergence of ADM is guaranteed. ADM is a hybrid method which gives solution in the form of series. Using the initial conditions we have calculated the results with refinement of interval. The interval in which critical value $t_c$ lies is also investigated.

In chapter 6, the results obtained by MEM, RK fourth order method and ADM are compared. It is observed that the solutions obtained by MEM are more accurate. It was also noticed that ADM is good for smaller intervals.
In chapter 7, the work in this study of numerical solution of system of six coupled nonlinear ODEs was summarized.