Chapter 8

Possible future developments

In this thesis we have mainly studied the existence of solitary waves and shock waves in unmagnetized plasmas. We have studied the problem in planar as well as in nonplanar cylindrical and spherical geometry. We have used reductive perturbation method to study solitary and shock waves in spherical and cylindrical geometries in different plasma models. This study can be extended to two dimensions and one can compare the results of Zakharov-Kuznetsov (ZK) equation and other solitary wave type equations in two dimensions. This will enable us to study the soliton solution in magnetized plasma which has not been studied in this thesis. So in presence of magnetic field the existence region and various properties of soliton and shock solutions can be studied. The study on cylindrical or spherical nonlinear waves can also be made in presence of magnetic field. Normally two dimensional studies are based on reductive perturbation techniques. ZK equation can be derived in this case provided one takes a particular kind of stretched coordinates. One can obtain exact solution in certain cases of the ZK equation. The nonlinear structure vortices can be studied in presence of relativistic effect in different plasma model because of their importance in space plasmas. We have not studied nonlinear envelopes-envelope solitons, envelope shocks and envelope holes which are very important in astrophysics and other branches of plasma physics. These can be studied to understand these features for cylindrical and spherical type nonlinear waves with the help of extensive numerical computations.