Abstract

In this thesis, we studied fast and slow magnetosonic wave modes in electron-ion (*ei*) and electron-positron-ion (*epi*) of plasmas which exist in space and astrophysical environments. We used a single fluid magnetohydrodynamic (MHD) model and by applying perturbation technique for solving nonlinear system of equations, we derived the Kadomatsev-Petviashvili (KP) equation. In *ei* plasma, we found that amplitude and width of soliton increases (decreases) with plasma β for slow (fast) mode. Also, when we increase the value of θ, the amplitude and width of soliton decrease (increase) for fast (slow) mode. In *epi* plasma, we found that amplitude and width of soliton increases (decreases) with plasma β for slow (fast) mode. Also, when we increase the ratio of the ion to electron temperature σ, the amplitude and width of soliton decrease (increase) for fast (slow) mode. We also see the effect of positron concentration on the formation of solitons. We found that when we increase the positron concentration, the amplitude and width of soliton decrease (increase) for fast (slow) mode.