ABSTRACT

The dominant medium for soliton propagation in electronics, nonlinear transmission line (NLTL) has found wide application for nonlinear dynamics and Kdv phenomena as well as for practical applications in ultra-sharp pulse/edge generation and novel nonlinear communication schemes in electronics. In this thesis, experiments on Electrical soliton propagation along non-linear transmission line are carried out and described.

The experiments are carried out using NLTL consisted of linear inductances and nonlinear capacitances. For nonlinear capacitances, Schottkey diodes are employed in reverse biased condition. In all experiments the Schottky diode 1N5819 and inductances L=22 μH are used. Research is carried out with different scheme of experiments. First experiment shows the effect of varied input voltage 5V, 10V and 15V at same frequency 100 KHz and inductance value 22μH on the speed, amplitude and width of the soliton. Second experiment shows the effect of capacitance of coupling capacitor on the generation and propagation of soliton. Third experiment shows the effect of pulse frequency of 100 KHz, 500 KHz, 1 MHz, 1.5 MHz and 2 MHz at same input voltage 5V on the generation mechanism of soliton.

The results describe the capacitance effect of coupling capacitor on soliton with varying the capacitance value whereas the frequency and input voltage remain the same. The results reveal that without coupling capacitor, high frequency is required to generate solitons. Also, the Soliton parameters are affected by input voltage, soliton with taller amplitude has lesser width and speed, and soliton with less amplitude has more width and speed.