Dynamic study and some exact compact solutions in a Nonlinear Electrical Transmission line

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In this paper, we investigate analytically the dynamics of the Extended Nonlinear Schrödinger (ENLS) equation describing the propagation of the modulated waves in the network characterized by the nonlinear resistance (NLR) by using the rotative wave approximation. We study the dynamic of the wave envelope by means of bifurcation of phases portrait. The result of this qualitative investigations indicates the existence of the nonlinear localized wave (NLW) with linear phase shift, such as peak, bright, dark, compact dark and compact pulse solitary wave. In addition, by considering the term of gradient only like the extended term of the NLS equation, the phase shift becomes nonlinear and the qualitative analyse predict the existence of a pair of bright-dark solitary waves which is usually exhibited by the coupled NLSEs only. We will find some implicit and explicit solution and will propagate in the nonlinear discrete electrical transmission line (NLTL) with nonlinear dispersion the modulated compact dark solitary wave depending on the frequency range of the chosen carrier wave, for physically realistic parameters.

Références

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