Travelling waves in nonlinear metamaterial lattices

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Abstract

Nonlinear Localizations appear generically in nonlinear metallic, and PT metamaterials in the presence of dissipation that is always present in practice. We consider a lattice equation modelling one-dimensional metamaterials formed by a discrete array of nonlinear resonators. We focus on periodic travelling waves due to the presence of a periodic force. The existence and uniqueness results of periodic travelling waves of the system are presented. Employing a Melnikov analysis we study the existence and persistence of such travelling waves, and study their linear stability. Our analytical results are found to be in good agreement with direct numerical computations.

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