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Rayleigh-Like Surface Waves on a Nonlinear Layered Elastic Half Space

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The work considers the propagation of small but finite amplitude Rayleigh-like waves on an elastic half space covered by a different elastic layer of uniform and finite thickness. It is assumed that the free boundary of the layered half space is free of tractions, and stresses and displacements are continuous at the interface between the layer and the half space. Then the nonlinear modulation of a group of surface waves centered around a wave number is examined by employing the method of multiple scales. It is shown that the first order slowly varying amplitude of the wave modulation is governed asymptotically by a nonlinear Schrodinger (NLS) equation. Then the dependence of the stability of the solutions and of the existence of solitary wave-type solutions of NLS equation on the nonlinear material parameters is investigated numerically for both hypothetical and real material models.

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