

On the Propagation of Solitary Waves in Microstructured Solids

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Wave propagation in microstructured media is essentially influenced by nonlinear and dispersive effects. The simplest model governing these effects results in the Korteweg-de Vries (KdV) equation. In the present paper a KdV type evolution equation, including the third- and fifth order dispersive and the fourth order nonlinear terms, is used for modelling the wave propagation in microstructured solids like martensitic-austenitic alloys. The model equation is solved numerically under localised initial conditions. Possible solution types are introduced and discussed. It is shown that if the relatively small solitary waves decay in time. However, if the amplitude exceeds a certain critical value then such a solitary wave can propagate with nearly a constant speed, an amplitude and consequently the energy. Unlike the KdV solitons, interaction of such solitary waves is not elastic – after the interaction their speed and amplitude are altered.

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