

Modeling of Solitary Impulses in a Composite Material Using Wavelet Analysis

Kateryna V. Terletska

S.P. Timoshenko Institute of Mechanics, Kiev, Ukraine

An original method for description of the solitary wave evolution in a material with the microstructure (a composite) is presented. A peculiarity of the proposed technique consists in using wavelet-analysis on the base of Mexican hat wavelets. These wavelets are the elastic wavelets, so they are solutions of the wave equations for elastic materials. In contrast to the prior studies when initial pulses had to satisfy rather strict conditions, it is shown that initial impulse shape can be an arbitrary form (it should only admits wavelet representation and be solitary one). The last can be meant as the main result of carried out study. Elastic wavelets based solution permits to reveal the microstructure effects, namely the essential dependence of the distance, on which evolution is visible, on the characteristic size of microstructure, and to extend the class of investigated pulses.

[View the extended summary](#)