Geophysical Research Abstracts
Vol. 20, EGU2018-19213, 2018
EGU General Assembly 2018

Wave propagation and attenuation in bimodular geomaterials

Maria S. Kuznetsova, Elena Pasternak, and Arcady V. Dyskin
The University of Western Australia, Perth, Australia (maria.kuznetsova@research.uwa.edu.au)

In this work we study wave propagation in a bimodular geomaterial, i.e. a material that has different moduli in compression and in tension. As a simple yet precise analogy of bimodular continuum, a long discrete chain of balls connected by bilinear springs and dampers, i.e. bilinear oscillators, is considered.

Depending on critical stiffness in compression and tension, different values of damping are analysed. Damping is modelled as a constant term as well as a nonlinear function simulating more complicated behaviour of geomaterials.

The discrete chain is subjected to an external sign-alternating excitation. An explicit Runge-Kutta algorithm is selected to study the response of the system of N ODEs. The results show that a higher damping leads to lower deformations and, subsequently, to higher energy dissipation. However, for certain types of excitation, interesting phenomenon is revealed. Only positive deformations remain while negative deformations get damped over time.