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DYNAMIC THEORY OF LAYERED MEDIUM WITH SLIP AT INTERLAYER BOUNDARIES[1]

[1]Nikitin I.S., [2]Burago N.G.
[1]Institute for Computer Aided Design of RAS, Moscow, 123056, Russia
[1] Institute for Problems in Mechanics of RAS, Moscow, 119526, Russia

Interest in the problem of propagation and transformation of waves in layered media is associated with problems of seismology and engineering geophysics. As a rule, the seismicity registered in the mountain areas where rocks come to the day surface. Often, these rocks contain regular grid of cracks and can be considered as a layered structure. Classic studies of wave fields in such environments usually come from the continuity of the displacement field. However, for sufficiently strong seismic effects the study should consider the possibility of tangential movements at the layer boundaries. For extended actions should be used the "averaging" continuous models of continuous media with the structure because it is impossible to keep the track on the deformation of each element of the structure.

In this paper, based on the asymptotic method [1], the averaged equations for layered medium with slippage are derived accounting the terms of the second order with respect to the small parameter layer thickness. The equations are built using the linear slip condition for the tangential displacement jumps at the boundaries and shear stresses. First approximation equations were derived earlier [2]. The results obtained in this paper, the equations are also asymptotically complete generalization of the model [3, 4] of layered media, based on the engineering approach or approximate hypotheses about the nature of the deformation layers.

The wave properties of the resulting system of equations and dispersion relations are investigated. Model problems of transformation of elastic waves passing through the layered geostructure near the earth's surface are solved.

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