MITLICONTINUUM WAVE PROPAGATION IN A LAMINATED BEAM WITH CONTRASTING STIFFNESS AND DENSITY OF LAYERS

Grigory Panasenko
Institute Camille Jordan,
Univ. de Lyon, France

The talk deals with the wave equation in a thin laminated beam with contrasting stiffness and density of layers. The problem contains two parameters: is a geometric small parameter , ratio of the diameter and its characteristic longitudinal size, is a physical great parameter, ratio of stiffness and densities of alternating layers. The asymptotic behavior of the solution depends on the combination of parameters 2. If this value is small then the limit model is a standard homogenized one-dimensional wave equation. On the contrary if 2 is not small then the limit model is presented by so called multi-continuum model, i.e. multiple one dimensional wave equations, coupled or non-coupled and "co-existing" in every point. The proof of these results uses the milticomponent homogenization method proposed in the paper G.P.Panasenko Multicomponent homogenization of processes in strongly non-homogeneous structures, Mathematics USSRSbornik,1990, 181,1,134-142(in Russian); English transl. in Math. USSR Sbornik,1991, 69, 1, 143-153.

The present result is published in G.P.Panasenko, Multicontinuum wave propagation in a laminated beam with contrasting stiffness and density of layers, Journal of Mathematical Science, 232, 4, 2018, 503-515, https://doi.org /10.1007/s10958-018-3889-7, translated from Problemy Matematicheskogo Analiza 93, 2018, pp. 89-99 https://doi.org/1072-3374/18/2286-0601, and was supported by the grant number 14-11-00306 of Russian Science Foundation executed by National Research University "Moscow Power Engineering Institute.