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Variation of Acoustic Properties with Material Parameters in Layered Nanocomposites

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We discuss some general features of the elastic vibration spectrum in layered nanocomposites based on the newly developed approach. The focus is on the compounds without any layering symmetry and on the dependence of their properties on various parameters. Some regular general features of the spectrum are revealed by a numerical and analytical study. In particular, existence of invariant characteristics which allow classification of the whole band structure in a way similar to the Sturm-Liouville theory. The spectral lines become multidimensional surfaces in the space which includes a variation of material parameters. It is demonstrated that confinement, layering and material selection produce qualitatively new properties which can be useful in applications.