Friday the 12 October 2018 at 10:00
Politecnico di Torino, DISMA, Aula Buzano (third floor)

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Spectra of the Neumann Square Lattices

Prof. Giacomo Como introduces the seminar

Abstract

The classical 1D Pauling model of a planar square lattice of thin 3D acoustic waveguides involves the Kirchhoff transmission conditions at nodes of the graph. Though this model does not provide an adequate description of the spectrum of the Neumann Laplacian in the 3D domain, because it indicates eigenvalues of infinite multiplicity (collapsed spectral bands) as well as it does not find open spectral gaps.
During his seminar, Prof. Narazor will present a refined 1D model which involves the Steklov-Robin transmission conditions at nodes and which is based on the two-term asymptotic decompositions. Thanks to this model, it can be demonstrated that the spectral bands in the low- and middle-frequency range cannot collapse and, indeed, a very narrow spectral gap may appear near them.

Biography

Sergey Nazarov is professor of mathematics and chief researcher at the Institute of Mechanical Engineering Problems, University of Saint Petersburg (Russia).
He mainly works on the qualitative analysis of partial differential equations and variational inequalities, with particular regard to spectral theory. His main achievements concern the asymptotic analysis of solutions of elliptic boundary value problems in domains with irregular boundaries and singular perturbations, and the asymptotics of spectral characteristics. His results apply to several problems arising in material science, such as in the theory of fracture, elasticity and hydro-dynamics, the theory of waves, and shape optimisation.

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