Friday 9 November 2018 – at 3:30 p.m.
Seminar Room “-1” – Department of Mathematics

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Symmetry and rigidity for composite membranes and plates

Abstract:
The composite membrane problem is an eigenvalue optimization problem that can be formulated as follows:

*Build a body of prescribed shape out of given materials (of varying densities) in such a way that the body has a prescribed mass and so that the basic frequency of the resulting membrane (with fixed boundary) is as small as possible.*

In the first part of the talk we will review the known results and present a Faber-Krahn-type result obtained in collaboration with G. Cupini (Università di Bologna).

A natural extension of the above problem to *plates* is the composite plate problem, which is an eigenvalue optimization problem involving the bilaplacian operator. The Euler-Lagrange equation associated to it is a fourth-order PDE that is coupled with Navier boundary conditions (for the hinged plate), or with Dirichlet boundary conditions (for the clamped plate).

In the second part of the talk we will focus on symmetry properties of optimal pairs highlighting the differences between the hinged and the clamped case. These results have been obtained in collaboration with F. Colasuonno (Università di Torino).

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