SEMINÁRIO

Dia 20 de Fevereiro (quarta-feira), às 11H00, na sala 6.2.47

Optimal reinforcing networks for elastic structures

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Abstract

We study the optimal reinforcement of an elastic membrane, fixed at its boundary, by means of a connected one-dimensional structure. The problem consists in finding the optimal configuration for the stiffeners, the problem is then a shape optimization problem, where the admissible competing shapes are one- dimensional networks of prescribed length. We show the existence of an optimal solution that may present multiplicities, that is regions where the optimal structure overlaps. The case where the connectedness assumption is removed is also presented. Some numerical simulations are shown to confirm the overlapping phenomenon and to illustrate the complexity of the optimal structures when their total length becomes large.

References
[1] G. Alberti, G. Buttazzo, S. Guarino Lo Bianco, E. Oudet: Optimal one- dimensional reinforcement for elastic membranes. Preprint, available at http://cvgmt.sns.it
[2] G. Buttazzo, E. Oudet, B. Velichkov: A free boundary problem arising in PDE optimization. Calc. Var., 54 (2015), 3829–3856

Local: FCUL – Edf. C6 - Piso 2, 6.2.33

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