

A minimaxmax problem for improving the torsional stability of rectangular plates

Davide Buoso

Universidade de Lisboa
Grupo de Física Matemática
Campo Grande, Edifício C6, 1749-016 Lisbon (Portugal)
Email: dbuoso@fc.ul.pt
Webpage: <http://dbuoso.altervista.org/>

Abstract: In this talk we introduce a new functional named “gap function” measuring the torsional stability of a partially hinged rectangular plate which models the deck of a suspension bridge, and we use it to compare the performances of different reinforced plates under the action of external forces. Then we address a shape optimization problem whose target is to minimize the torsional displacements of the plate: this leads us to set up a minimaxmax problem, which includes a new kind of worst-case optimization. We consider two types of reinforcements: one aims to strengthen the plate, the other aims to weaken the action of the external forces. For both of them we study the existence of optima within suitable classes of external forces and reinforcements. We also show some numerical experiments and provide a number of open problems and conjectures.

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