



MAFIA - the seminar you can't refuse

## **The Method of Fundamental Solutions and its application for solving shape optimization problems**

**Pedro Antunes**

University of Lisbon

10 March 2020

13:15–14:15

in T112

Fakulta jaderná a fyzikálně inženýrská, ČVUT v Praze  
Trojanova 13, 12000 Praha

**Abstract:** In this talk we give an overview of the application of the Method of Fundamental Solutions (MFS) for solving boundary value problems with elliptic PDE's. The MFS is a meshfree numerical method where the solution is approximated by a linear combination of shifts of the fundamental solution of the elliptic differential operator. We present a theoretical framework providing density results and bounds for the error that justify the convergence of the method. Moreover, we address an algorithm to reduce the ill conditioning of the MFS matrices. Finally, we describe the application of the MFS for optimizing the shape and density of a membrane of a drum, so that it can be tuned.