

## **Minisymposium proposal**

**Topic: 700 - Numerical Methods and Algorithms in Science and Engineering**

**Title: Global Optimization Methods and Algorithms**

**Organizers: João Barradas Cardoso and Artur Barreiros**

Instituto Superior Técnico  
Mechanical Engineering Department  
Lisbon  
Portugal

### **Field description and seminar objectives:**

The main objective of this seminar is to bring together a set of engineering applications where optimization methods play a major role. Priority will be given to applications involving deterministic or stochastic problems with one or multiple purposes.

Mostly, in practical optimization applications it is important to find global solutions rather than local ones. Robust and efficient software should be used to search for those solutions. The computational effort to solve a global optimization problem is substantial thus solving them remains a challenge from both mathematical and computational viewpoints.

Two major areas stand for global optimization problems: Deterministic and Stochastic. Deterministic methods for global optimization include finite exact, covering, zooming, generalized descent, and tunneling methods. Stochastic methods for global optimization include controlled random search, simulated annealing, stochastic integration, stochastic zooming, artificial neural networks, and evolutionary algorithms.

The solution for a multi-objective optimization problem is more complex and less definite than that for a single-objective problem. Two main strategies for solving multi-objective optimization problems are Scalarization and Vector Optimization Methods. Techniques used for solving the single-objective problem may be incorporated in those strategies.