

# Preface

During the period July 20–24, 2009, the research group on Optimization of the Autonomous University of Barcelona organized an advanced course at the CRM, with the aim of promoting research in the area of optimization in all of its components: theory, algorithms, and practical problems. This volume is a unified version of the material presented in the course.

The advanced course was entitled *Optimization: Theory, Methods, and Applications*. The courses and the written material were accordingly divided into these three main parts. The theoretical part of the book is a self-contained course on the general moment problem and its relations with semidefinite programming, presented by Jean B. Lasserre, senior researcher at the CNRS (France), world-leading specialist of the domain and author of a recent research monograph on this topic (Imperial College Press, 2009). The second part is dedicated to the problem of determination of Nash equilibria from an algorithmic viewpoint. This part is presented by Francisco Facchinei, professor at the University of Roma “La Sapienza”, established researcher and co-author of an extended monograph on this topic (Springer, two volumes). The third part is a study of congestion models for traffic networks. This part develops modern optimization techniques for finding traffic equilibria based on stochastic optimization and game theory. It has been presented by Roberto Cominetti, professor at the University of Chile, who has been working for several years on congestion models of the traffic of the municipality of Santiago de Chile.

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