Preface

This volume contains a selection of papers that were presented at the *Modeling and Optimization: Theory and Applications* (MOPTA) conference held at Lehigh University in Bethlehem, Pennsylvania, USA, on August 18–20, 2010. MOPTA 2010 aimed to bring together a diverse group of researchers and practitioners, working on both theoretical and practical aspects of continuous or discrete optimization. The goal was to host presentations on the exciting developments in different areas, and at the same time provide a setting for close interaction among the participants.

The topics covered at MOPTA 2010 varied from algorithms for solving convex, network, mixed-integer, nonlinear, and global optimization problems, and addressed the application of optimization techniques in finance, logistics, health, and other important fields. The five papers contained in this volume represent a sample of these topics and applications, and illustrate the broad diversity of ideas discussed at the conference.

The first part of the name MOPTA highlights the role that modeling plays in the solution of an optimization problem, and indeed, the first two papers in this volume illustrate the benefits of effective modeling techniques. The paper by Mitchell, Pang, and Yu proposes a variety of ways in which a model of a mathematical program with complementarity constraints can be improved with additional constraints. These constraints yield tighter bounds, which can be exploited within certain algorithms. The paper by Chiang and Chen considers new modeling techniques for combinatorial problems arising in communication networks, where it is paramount that the optimization algorithm is distributed.

The next three papers in the volume address the other foci of MOPTA, namely optimization algorithms, theory, and applications. The paper by Iyengar, Phillips, and Stein proposes a first-order method for solving packing–covering semidefinite programs, which arise in important combinatorial problems. Their method is shown to produce highly accurate solutions in a running time faster than interior-point methods. The paper by Howe revives previously unpublished results related to the Shapley–Folkman theorem and extensions of it. Finally, the paper by Romanko, Ghaffari-Hadigheh, and Terlaky expounds on the relationships between multiobjective and parametric optimization, and provides a methodology for the constructing

the Pareto efficient frontier. This latter contribution is significant as the frontier can be constructed without discretizing the objective space, thus significantly reducing the computation time.

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