Preface

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This particular special issue contains outstanding papers presented at the 10th International Conference on Parametric Optimization and Related Topics (paraoptX) which was held at the Karlsruhe Institute of Technology, Germany, September 20–24, 2010.

The conference series *Parametric Optimization and Related Topics* was founded in 1985 and took place each 2–3 years in different places (the last six conferences prior to Karlsruhe were held in Enschede (1995), Tokyo (1997), Dubrovnik (1999), Puebla (2002), Cairo (2005), and Cienfuegos (2007)). We are indebted and thankful to Jürgen Guddat (Humboldt University Berlin) and Hubertus Th. Jongen (RWTH Aachen University) for co-founding, leading and promoting this series very successfully as its executive committee members before their retirements a few years ago.

The scientific programme for the 60 participants from 17 countries of paraoptX was composed of six invited and 41 contributed talks. We are especially thankful to our distinguished invited speakers, Christodoulos A. Floudas, Sven Leyffer, Boris Mordukhovich, Jiri Outrata, Teemu Pennanen, and Andreas Wächter who also contributed to this special issue. Furthermore, we thank our sponsors: the German Research Foundation (DFG), the University of Birmingham, and the Karlsruhe Institute of Technology. Without their generous support this conference would not have been possible.

Parametric optimization is a part of mathematical programming and has emerged as an exciting research area in theory and applications. It investigates the properties

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of solutions to optimization problems under data perturbations or uncertainty. Many relations to other disciplines of operations research, like stochastic programming, complementarity problems, mixed-integer problems, model-building, numerical methods, multi-objective optimization and optimal control, originate from these properties. In the following we give a short characterization of the papers in this special issue which cover a wide spectrum of important topics in parametric optimization.

B.S. Mordukhovich and H.M. Phan develop new tangential extremal principles in variational analysis which deal with infinite systems of (non-)convex sets. The first part of the paper presents the basic theory for these new principles and the second part discusses applications to semi-infinite programming and multiobjective optimization.

H.Th. Jongen and V. Shikhman deal with bilevel optimization problems from the optimistic point of view. They discuss the structure of the feasible set under generic assumptions as well as local reduction properties and optimality conditions.

T. Pennanen and A.-P. Perkkiö consider parametric dynamic stochastic optimization problems with a random variable as a parameter. They present sufficient conditions for the existence of solutions and discuss relations to no-arbitrage conditions from mathematical finance.

The paper by R. Henrion, J.V. Outrata, and T.Surowiec is concerned with a class of generalized equations which are related to optimality conditions of optimization problems with equilibria. They discuss the computation of regular coderivatives of solution maps which are associated with this class of generalized equations.

D. Dorsch, F. Guerra-Vázquez, H. Günzel, H.Th. Jongen, and J.-J. Rückmann focus on parametric semi-infinite optimization problems. They show that the corresponding critical value function can be described as the sum of two particular functions.

The paper by R. Misener and C.A. Floudas contains extensive computational results and is devoted to a novel deterministic global optimization approach for non-convex mixed-integer quadratically-constrained quadratic programs.

O. Stein and P. Steuermann treat semi-infinite optimization problems and propose a numerical solution method where a sequence of convex relaxations of the lower level problem are solved by reformulating them as programs with complementarity constraints.

F.E. Curtis, J. Huber, O. Schenk, and A. Wächter study an implementation of an interior-point algorithm for large-scale optimization problems and present numerical results for non-linear and PDE-constrained problems.

Finally, it is a pleasure to acknowledge the help we have received. We thank Daniel Ralph, Editor-in-Chief of Mathematical Programming Series B, for giving us the opportunity to organize and edit this special issue, and for his help and smooth cooperation throughout the editorial process. Our deepest gratitude belongs to the authors and to all the referees for their careful reading and substantial critical remarks which were essential in improving the presentation and quality of this special issue.

Birmingham and Karlsruhe, May 2012
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(paraopt chairs)