

## Preface

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Over the last decade, Stochastic Programming (SP) has emerged as one of the more vibrant areas of theoretical and applied research. The Tenth International Conference on Stochastic Programming conference, which was held at the University of Arizona (Tucson, AZ, USA) reflected the range of activities that come under the rubric of stochastic programming. This volume is a selection of papers representing the range presented at the conference.

Connections between SP and other decision-making paradigms highlight the rich modeling framework provided by SP. The paper by *Wallace* demonstrates connections between SP and Real Options, and shows that for situations in which the options to be evaluated are not entirely clear, SP provides a formal modeling approach to discover them. Another paper that ties SP to more traditional methodologies is that of *Ermoliev, Ermolieva, Fischer, and Makowski*. In this paper, they investigate the relationship between stochastic programming approaches and discounting.

One of the more widely cited applications of stochastic programming is in the area of portfolio optimization. Several papers in this volume are devoted to this topic. *Rodríguez-Mancilla* studies risks associated with strategies followed by a risk-averse investor who maximizes the expected value of his/her final wealth, subject to a risk tolerance constraint such as Conditional Value-at-Risk. *Van der Vlerk, Klein Haneveld, Streutker*, present a multistage recourse model for Dutch pension funds. The paper by *Rios and Sahinidis* presents a global optimization algorithm for situations in which the utility function for portfolio selection is modeled using an indefinite quadratic function. Another application for which stochastic programming has a great deal of potential is in the area of airline yield management. *Chen and Homem-de-Mello* propose solving a sequence of two-stage stochastic programs with simple recourse. This approach can be viewed as an approximation to a multi-stage stochastic programming formulation.

In addition to its use in modeling and applications, SP has posed several interesting mathematical and algorithmic questions over the years. One such question, addressed in the paper

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by *Henrion and Roemisch*, provides a condition for differentiability as well as an equivalent criterion for Lipschitz continuity of singular normal distributions. Among the algorithmic questions addressed in this volume are several issues related to discrete decisions under uncertainty. The paper by *Beraldí and Bruni* presents a specialized branch-and-bound algorithm for probabilistically constrained problems in which the technology matrix is not deterministic. Using knapsack constraints as the basis for branching, the new algorithm addresses a long-standing issue in stochastic programming. Another application of knapsack constraints arises in the paper by *van der Vlerk* in which the second stage of a stochastic mixed-integer program has only one constraint. In this paper, the author shows that convex approximations can be developed using concepts that were developed for the simple integer recourse problem. Finally, the paper by *Van Hentenryck and Bent* connects stochastic programming with online optimization under uncertainty.

The final two papers are numerical in nature. *Gouda and Szantai*, deal with numerical methods for computing probabilities of the Dirichlet distribution; and *Deák* presents computations dealing with approximations of large-scale stochastic programs using a succession of regressions.

Together the papers in this volume provide a broad overview of the Tenth International Conference on Stochastic Programming. The editors thank the U.S. National Science Foundation (NSF), the Air Force Office of Scientific Research (AFOSR), the University of Arizona, and the MORE Institute (Modeling, Optimization, Research and Education) for their generous support of the conference.