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A Long View of Research and Practice in Operations Research and Management Science

The Past and the Future

ManMohan S. Sodhi
Christopher S. Tang
Editors

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Foreword

As generation of academics and practitioners follows generation, it is worthwhile to compile long views of the research and practice in the past to shed light on research and practice going forward. This collection of peer-reviewed chapters is intended to provide such a long view. The effort is motivated by the views of Professor Arthur M. Geoffrion, who we seek to honor for not only his considerable contribution to OR/MS research in the past decades but also his continuing championship and involvement in matters pertaining to the education and practice of OR/MS.

Professor Geoffrion's contributions are well highlighted in "About Professor Arthur M. Geoffrion," but I would like to add a personal note. When I was an unknown first year assistant professor and Art was an established superstar, he took the trouble to obtain a copy of my thesis, read it, and call me to offer advice and encouragement. His advice covered both high-level direction and important details and was delivered with a charm and humor that made it easy to accept. For example, I was pretty green then as a mathematician and had used the term "cycle-less graph" in my thesis. Art's wry remark was "'Cycle-less graph,' that must be an east coast term. Here in California, and I think most of the world, that's called an 'acyclic graph'." My thesis concerned using Lagrange multipliers to solve job shop scheduling problems. Art subsequently described in the article Geoffrion, AM. (1974) Lagrangean relaxation for integer programming. Math Program Stud 2:82–114 how this work and several other problem-specific uses of Lagrange multipliers could be embraced within a powerful concept he called "Lagrangian Relation."

The target audience of this book is young researchers, graduate/advanced undergraduate students from OR/MS and related fields like computer science, engineering, and management as well as practitioners who want to understand how OR/MS modeling came about over the past few decades and what research topics or modeling approaches they could pursue in research or application.

This book contains a collection of chapters written by leading scholars/practitioners who have continued their efforts in developing and/or implementing innovative OR/MS tools for solving real-world problems. In this book, the contributors share their perspectives about the past, present, and future of OR/MS theoretical development, solution tools, modeling approaches, and applications. Specifically, this book collects chapters that offer insights about the following topics:

- Survey articles taking a long view over the past two or more decades to arrive at the present state of the art while outlining ideas for future research. Surveys focus on use of a particular OR/MS approach, e.g., mathematical programming (LP, MILP, etc.), and solution methods for particular family of application, e.g., distribution system design, distribution planning system, health care.
- Autobiographical or biographical accounts of how particular inventions (e.g., structured modeling) were made. These could include personal experiences in early development of OR/MS and an overview of what has happened since.
- Development of OR/MS mathematical tools (e.g., stochastic programming, optimization theory).
- Development of OR/MS in a particular industry sector such as global supply chain management.
- Modeling systems for OR/MS and their development over time as well as speculation on future development (e.g., LINDO, LINGO, and What's *Best*!).
- New applications of OR/MS models (e.g., happiness).

I believe this book will stimulate others to follow Professor Geoffrion's footsteps in making OR/MS a vibrant community.

The Wharton School, Marshall Fisher
University of Pennsylvania,
Philadelphia, PA, USA
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Name (in alphabetical order)	Affiliation	Chapter
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Manel Baucells, Rakesh Sarin	IESE Business School, University of California, Los Angeles	Optimizing happiness
Dirk Beyer, Scott Clearwater, Kay-Yut Chen, Qi Feng, Bernardo A. Huberman, Shailendra Jain, Alper Sen, Hsiu-Khuern Tang, Zainab Jamal, Bob Tarjan, Krishna Venkatraman Julie Ward, Alex Zhang, Bin Zhang	M-Factor, Inc., Hewlett-Packard Labs, University of Texas at Austin, Bilkent University, Intuit	Advances in business analytics at HP Laboratories

John Birge	University of Chicago	The persistence and effectiveness of large-scale mathematical programming strategies: Projection, outer linearization, and inner linearization
Gerald G. Brown (and Richard E. Rosenthal, deceased)	Naval Postgraduate School	Optimization tradecraft: Hard-won insights from real-world decision support (reprinted with permission from INFORMS)
Daniel Dolk	Naval Postgraduate School	Structured modeling and model management
Donald Erlenkotter	University of California, Los Angeles	Economic planning models for India in the 1960s
Robert Fourer	Northwestern University	Cyber-infrastructure and optimization
Arthur M. Geoffrion, Glenn Graves	University of California, Los Angeles	Multi-commodity distribution system design by Bender's decomposition (reprinted with permission from INFORMS)
Hau L. Lee	Stanford University	Global trade process and supply chain management
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Richard Powers	Formerly at INSIGHT Inc.	Retrospective: 25 years applying management science to logistics
ManMohan S. Sodhi, Christopher S. Tang	City University London, University of California, Los Angeles	Capitalizing on our strengths to avail opportunities in the face of weakness and threats
Mark S. Daskin, Sanjay Mehrotra, Jonathan Turner	Northwestern University, University of Michigan	Perspectives on healthcare resource management problems

Last, but not least, we are grateful to Mirko Janc for typesetting each chapter beautifully and expeditiously. Of course, we are responsible for any errors that may occur in this book as a result of our editing or our own writing.

ManMohan S. Sodhi, London
Christopher S. Tang, Los Angeles

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