

Fixed-Point Algorithms for Inverse Problems in Science and Engineering

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VOLUME 49

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Aims and Scope

Optimization has been expanding in all directions at an astonishing rate during the last few decades. New algorithmic and theoretical techniques have been developed, the diffusion into other disciplines has proceeded at a rapid pace, and our knowledge of all aspects of the field has grown even more profound. At the same time, one of the most striking trends in optimization is the constantly increasing emphasis on the interdisciplinary nature of the field. Optimization has been a basic tool in all areas of applied mathematics, engineering, medicine, economics and other sciences.

The series *Springer Optimization and Its Applications* publishes undergraduate and graduate textbooks, monographs and state-of-the-art expository works that focus on algorithms for solving optimization problems and also study applications involving such problems. Some of the topics covered include nonlinear optimization (convex and nonconvex), network flow problems, stochastic optimization, optimal control, discrete optimization, multi-objective programming, description of software packages, approximation techniques and heuristic approaches.

Heinz H. Bauschke • Regina S. Burachik
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ISSN 1931-6828

ISBN 978-1-4419-9568-1

e-ISBN 978-1-4419-9569-8

DOI 10.1007/978-1-4419-9569-8

Springer New York Dordrecht Heidelberg London

Library of Congress Control Number: 2011928237

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Printed on acid-free paper

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Preface

This book brings together 18 carefully refereed research and review papers in the broad areas of optimization and functional analysis, with a particular emphasis on topics related to fixed-point algorithms. The volume is a compendium of topics presented at the *Interdisciplinary Workshop on Fixed-Point Algorithms for Inverse Problems in Science and Engineering*, held at the Banff International Research Station for Mathematical Innovation and Discovery (BIRS), on November 1–6, 2009. Forty experts from around the world were invited. Participants came from Australia, Austria, Brazil, Bulgaria, Canada, France, Germany, Israel, Japan, New Zealand, Poland, Spain, and the United States.

Most papers in this volume grew out of talks delivered at this workshop, although some contributions are from experts who were unable to attend. We believe that the reader will find this to be a valuable state-of-the-art account on emerging directions related to first-order fixed-point algorithms.

The editors thank BIRS and their sponsors – Natural Sciences and Engineering Research Council of Canada (NSERC), US National Science Foundation (NSF), Alberta Science Research Station (ASRA), and Mexico’s National Council for Science and Technology (CONACYT) – for their financial support in hosting the workshop, and Wynne Fong, Brent Kearney, and Brenda Williams for their help in the preparation and realization of the workshop. We are grateful to Dr. Mason Macklem for his valuable help in the preparation of this volume. Finally, we thank the dedicated referees who contributed significantly to the quality of this volume through their instructive and insightful reviews.

Kelowna (Canada)
Adelaide (Australia)
Paris (France)
Ithaca (U.S.A.)
Göttingen (Germany)
Waterloo (Canada)
December 2010

Heinz H. Bauschke
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