

PREFACE: SPECIAL ISSUE IN HONOR OF PROFESSOR R. TYRRELL ROCKAFELLAR ON THE OCCASION OF HIS 90TH BIRTHDAY

LIQUN QI, JIE SUN, MICHEL A. THÉRA AND XINMIN YANG

This special issue contains 10 papers and is dedicated to Professor R. Tyrrell Rockafellar, Emeritus Professor at the University of Washington, on the occasion of his 90th birthday.

Over the six decades since completing his Ph.D. at Harvard University in 1963, Professor Rockafellar has played a central role in shaping the fields of optimization and variational analysis. His work laid the foundation for modern convex and nonlinear optimization, with lasting influence on both theoretical developments and algorithmic frameworks.

The depth and breadth of his contributions have had a profound and enduring impact on generations of researchers. For many of us, his books and papers have served not merely as references, but as sources of guidance—often providing just the insight needed to resolve complex and challenging problems. His legacy is deeply woven into the language, methods, and direction of our field.

Among his most influential publications are the seminal monographs *Convex Analysis* (1970) and *Variational Analysis* (1998, co-authored with R. J-B. Wets), which have become foundational texts across mathematics, economics, engineering, and beyond. His pioneering work on subdifferentials, duality theory, maximally monotone operators, and proximal methods has transformed how we formulate and solve optimization problems. In recent decades, his research in risk measures and mathematical finance has further extended the reach of his ideas.

Professor Rockafellar's contributions have been recognized with numerous prestigious honors. He was the inaugural recipient of the George B. Dantzig Prize (1982), awarded jointly by SIAM and the Mathematical Programming Society, and later received the John von Neumann Theory Prize (1992) from SIAM and the Lanchester Prize (1998) from INFORMS. He has been awarded honorary doctorates from the Universities of Groningen, Montpellier, Santiago, and Alicante. In 2004, he was named a Pioneer of Stochastic Programming.

To celebrate this milestone, a workshop on variational analysis and nonsmooth optimization was organized by Professor Defeng Sun and his colleagues at the Department of Applied Mathematics of The Hong Kong Polytechnic University on December 1–4, 2024. Many of the authors and editors of this special issue participated in this event—students, collaborators, and longtime colleagues—gathering to honor Professor Rockafellar's remarkable legacy and to share current work inspired by his vision.

As editors of this volume, we express our deep appreciation for Professor Rockafellar's intellectual leadership, mentorship, and lasting contributions to the field. His clarity of thought, unwavering rigor, and generosity of spirit continue to inspire us.

We extend to him our warmest congratulations and best wishes for continued health, happiness, and many joyful returns of this special anniversary.

LIQUN QI

Emeritus Professor at The Hong Kong Polytechnique University

JIE SUN

Emeritus Professor at National University of Singapore and Curtin University, Australia

MICHEL A. THÉRA

XLIM UMR-CNRS 7252, Emeritus Professor at the University of Limoges, France

XINMIN YANG

Professor at Chongqing Normal University

Director of National Center for Applied Mathematics in Chongqing, PRC