

PREFACE: NONLINEAR AND VARIATIONAL ANALYSIS

SIMEON REICH, XIANFU WANG, AND ALEXANDER J. ZASLAVSKI

This special issue on Nonlinear and Variational Analysis is in memory of Professor Jonathan M. Borwein.

Jonathan Michael Borwein (1951–2016), Laureate Professor, School of Mathematical and Physical Sciences, University of Newcastle, NSW, Australia, was an outstanding British Canadian mathematician.

He was born in St. Andrews, Scotland, in 1951, received his B.A. (Honours Math) from the University of Western Ontario in 1971, and his D.Phil. from the University of Oxford in 1974 as a Rhodes Scholar at Jesus College. Prior to joining Simon Fraser University in 1993, he worked at Dalhousie University (1974–91), Carnegie-Mellon University (1980–82) and the University of Waterloo (1991–93). He was the Shrum Professor of Science (1993–2003) and a Canada Research Chair in Information Technology (2001–08) at Simon Fraser University, where he was the Founding Director of the Centre for Experimental and Constructive Mathematics, and developed the Inverse Symbolic Calculator together with his brother, Peter Borwein, and Simon Plouffe. In 2004, he (re-)joined the Faculty of Computer Science at Dalhousie University as a Canada Research Chair in Distributed and Collaborative Research, cross-appointed in Mathematics, while preserving an adjunct appointment at Simon Fraser.

Jonathan's interests covered pure mathematics (analysis), applied mathematics (optimization), computational mathematics (numerical and computational analysis), and high performance computing. He was also an expert on the number π and especially its computation.

Jonathan authored (or co-authored) ten books (most recently several on Experimental Mathematics and a monograph on convex functions), and over 400 refereed articles. He was a co-founder (1995) of a software company, MathResources, consulting and producing interactive software primarily for school and university mathematics.

He was Governor at large of the Mathematical Association of America (2004–07), president of the Canadian Mathematical Society (2000–02) and chair of (the Canadian National Science Library) NRC-CISTI Advisory Board (2000–2003). He served as chair of various of NATO scientific programs. He was also Chair of the Scientific Advisory Committee of the Australian Mathematical Sciences Institute (AMSI). He chaired the Canadian HPC consortium, now Compute Canada and the International Mathematical Union's Committee on Electronic Information and Communications (2002–2008).

Jonathan has received various awards including the Chauvenet Prize (1993), Fellowship in the Royal Society of Canada (1994), Fellowship in the American Association for the Advancement of Science (2002), an honorary degree from Limoges (1999), and foreign membership in the Bulgarian Academy of Sciences (2003). He

was elected as a Fellow to the Australian Academy of Science (2010). In 2014 he became a Fellow of the American Mathematical Society. He was an ISI highly cited mathematician for the period 1981-1999.

Without any doubt, Jonathan's mentorship has been instrumental in training many graduate students and postdoctoral fellows, and his research work has influenced many outstanding mathematicians. In this special issue we present papers authored by a selected group of well-recognized experts in the areas of nonlinear and variational analysis, and their applications. Most of the papers collected here have been contributed by friends and colleagues of Jonathan M. Borwein, who have been influenced by his research. The special issue contains fourteen papers contributed by researchers in nonlinear and variational analysis, and in optimization theory, from Australia, Brazil, Canada, China, France, Germany, Iran, Israel, Italy, Japan, Romania, Taiwan, and the United States.

These papers cover a wide spectrum of important problems and topics of current research interest in nonlinear and variational analysis, and in optimization theory, including proximal averages for minimization of entropy functionals, exact penalization and optimality conditions for constrained directional Pareto efficiency, classification of ε -isometries by stability, on the transfinite mean value interpolation of Dyken and Floater, convergence analysis of the Gauss-Newton method for convex inclusion problems and convex composite optimization, set optimization problems on ordered topological vector spaces, characterizing the contingent cone's convex kernel, cutting plane oracles for non-smooth trust-regions, stability of the optimal values under small perturbations of the constraint set, a strong convergence theorem for quasi-contractive mappings and inverse strongly monotone mappings, weak and strong convergence theorems for generic generalized nonspreading mappings in Banach spaces, solution analysis for a class of set-inclusive generalized equations, the residuality of certain classes of convex functions, and a nonintersection property for solutions of discrete time optimal control problems.

Therefore we feel that this special issue will be highly important for many mathematicians and applied scientists, who are interested in recent developments in nonlinear and variational analysis, and in optimization theory, as well as in their numerous applications.

To conclude, as editors we would like to thank the authors for contributing their state-of-the-art work to this special issue, and the anonymous referees for their hard and dedicated work.

Simeon Reich, Xianfu Wang and Alexander J. Zaslavski, Editors

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