



PREFACE: VARIATIONAL ANALYSIS AND OPTIMIZATION THEORY

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This special issue on Variational Analysis and Optimization Theory is dedicated to Professor Roger J-B Wets on the occasion of his 85th birthday.

Roger J-B Wets is a leader in stochastic programming and in variational analysis. His research, expositions, graduate students, and his collaboration with R. Tyrrell Rockafellar have had a profound influence on optimization theory, computations, and applications. Since 2009, Wets has been a distinguished research professor at the mathematics department of the University of California, Davis.

Roger Wets was born in 1937. He attended high school in Belgium, after which he worked for his family while earning his Licence in applied economics from Université de Bruxelles (Brussels, Belgium) in 1961. Roger Wets studied optimization with George Dantzig at the program in operations research at the University of California, Berkeley. Dantzig and David Blackwell jointly supervised his dissertation. In 1965 Roger Wets met R. Tyrrell Rockafellar, starting a collaboration of many decades.

Roger Wets helped to lead a project on decision-making under uncertainty at the International Institute for Applied Systems Analysis. He worked at Boeing Scientific Research Labs during 1964–1970 and was Ford Professor at the University of Chicago, during 1970–1972 before being appointed Professor at the Mathematics Department of the University of Kentucky and then University Research Professor (1977–78). While at the International Institute for Applied Systems Analysis (IIASA) in Austria, during 1980–1984, he led research in decision-making in uncertainty, returning as an acting leader in 1985–1987; during that time, Wets and Rockafellar developed the progressive-hedging algorithm for stochastic programming. The University of California, Davis, named him Professor (1984–1997), Distinguished Professor, and Distinguished Research Professor of Mathematics (2009–). Besides his theoretical and computational contributions, Wets has worked in applications to lake ecology (IIASA), finance (Frank Russel investment Systems), and developmental economics (World Bank). He also consulted with the development of professional stochastic optimization software (IBM).

In 1994 Roger Wets was awarded the George B. Dantzig Prize for “original research that has had a major impact on the field of mathematical programming” by the Society for Industrial and Applied Mathematics (SIAM) and the Mathematical Programming Society. Roger and his coauthor R. Tyrrell Rockafellar were awarded the 1997 Frederick W. Lanchester Prize by the Institute for Operations Research and the Management Sciences (INFORMS) for their monograph “Variational Analysis”, which was published in November 1997 and copyrighted in 1998.

Professor Wets is an author of 3 books and 191 research papers. He has had 13 PhD students.

In this special issue we present papers authored by a selected group of experts in the areas of Variational Analysis and Optimization Theory. Most of the papers collected here have been contributed by friends and colleagues of Professor Wets, who were influenced by his scientific work. This special issue contains sixteen papers contributed by researchers in Variational Analysis and Optimization Theory from Australia, Cameroon, Canada, China, Germany, Hong Kong, Iran, Israel, Italy, Romania, Russia, United Kingdom and the USA.

These papers cover a wide spectrum of important problems and topics of current research interest, including proximal iterative algorithm for fixed point problems, the pseudo-monotonicity of tensor variational inequalities, a primal–dual algorithm as applied to optimal control problems, an infinite dimensional generalization of the excess demand theorem of David Gale, Hadamard semidifferential of continuous convex functions, exact multidimensional penalty DCA for constrained nonsmooth DC optimization in Banach spaces, stochastic optimization with estimated objectives, directional derivatives for set-valued maps based on set convergences, solution of a singular minimum energy control problem for time delay systems, a semismooth Newton-type method for bilevel programs with a linear lower level problem, minimal integrity bases of invariants of second order tensors in a flat Riemannian space, variational analysis of preference relations and their utility representations, adaptive algorithms for relatively Lipschitz continuous convex optimization problems, optimality conditions for a class of problems in mathematical programming with equilibrium constraints, approximate solutions of a set-valued inclusion in a metric space and Clarke subdifferential for Lipschitz functions on Asplund spaces.

Therefore we feel that this special issue will be highly important for many mathematicians, who are interested in recent developments in Variational Analysis and Optimization Theory, as well as in their numerous applications.

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