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EDITORIAL
A SPECIAL ISSUE DEDICATED TO CHRISTIANE TAMMER

Scalarization techniques are at the core of the theoretical as well as numerical developments in vector and set-valued optimization. Christiane Tammer holds a special place in the advancement of scalarization techniques as she strengthened one of the most influential classes of nonlinear scalarization functionals and applied it to explore various aspects of optimization.

This special issue aims to honor Christiane Tammer's valuable contributions to the critical field of nonlinear scalarization by collecting some of the most recent advancements in scalarization techniques and their numerous applications in vector optimization, set optimization, and robust optimization.

This special issue is comprised of ten articles of excellent scientific quality whose contribution is summarized in the following:

B. Mordukhovich and N. M. Nam, in the interesting article entitled "The Fermat-Torricelli Problem and Weiszfeld's Algorithm in the Light of Convex Analysis," investigate the celebrated Fermat-Torricelli problem from both theoretical and algorithmic viewpoints by employing the powerful machinery of convex analysis and optimization.

The objective of the paper entitled "Variational Principles in Set Optimization with Domination Structures and Application to Changing Jobs" by T. Q. Bao and A. Soubeyran is to propose and analyze new versions of Ekeland's variational principle in set optimization with domination structure. The authors use Gerstewitz's nonlinear scalarization function to convert a set-valued map into an extended real-valued function and the idea of the proof of Dancs-Hegedus-Medvegyev's fixed-point theorem. The developed framework applies to dynamic processes of changing jobs where the cost function does not satisfy the symmetry axiom of metrics and the class of set-valued maps acting from a quasi- metric space into a real linear space.

A. Löhne, D. Dörfler, A. Rittmann, and B. Weißing in the contribution entitled "Solving Bilevel Problems with Polyhedral Constraint Set," investigate the relationship between bilevel programs and polyhedral projection problems. They generalize a result by Fulop (1993) to show that solving a bilevel problem with polyhedral constraints is equivalent to optimizing the upper-level objective over certain facets of an associated polyhedral projection problem. Based on this result, they develop an algorithmic framework to compute solutions of bilevel problems and provide convincing numerical examples.

C. Gutiérrez, in the paper entitled "Ekeland Variational Principles for Vector Equilibrium Problems with Solid Ordering Cones," focuses on Ekeland variational principles for vector bifunctions. The technical tools are the nonlinear scalarization obtained through the well-known Gerstewitz functional, a new lower-semicontinuity concept for vector functions, and a generalization of the triangle inequality property of a vector bifunction. The new results subsume and generalize existing Ekeland variational principles for certain Henig approximate solutions of vector equilibrium problems.

K. Ike, M. Liu, Y. Ogata, and T. Tanaka, in the contribution entitled "Semicontinuity of the Composition of Set-Valued Map and Scalarization Function for Sets," study certain essential features of the semicontinuity of set-valued maps via general scalarization for sets. The main results generalize and subsume some of the existing results.

L. T. Tung, T. T. Khai, P. T. Hung, and P. L. B. Ngoc, in the paper entitled "Karush-Kuhn-Tucker Optimality Conditions and Duality for Set Optimization Problems with Mixed Constraints" provide new Karush-Kuhn-Tucker necessary and sufficient optimality conditions for strict minimal solutions. They also consider Mond-Weir and Wolfe dual problems of the set optimization problems with mixed constraints. Examples are given to illustrate the key ideas.

The paper entitled "Representation of the Pareto Front for Heterogeneous Multi-Objective Optimization" by J. Thomann and G. Eichfelder is devoted to optimization problems with multiple objectives involving functions that are expensive from the evaluations point of view. Motivated by a recent work where the Tammer-Weidner-functional played a central role, the authors present three heuristic approaches, which allow finding additional optimal solutions of the multiobjective optimization problem and by that representation at least of parts of the Pareto front. The authors present theoretical results supported by encouraging computational results.

C. Günther and N. Popovici, in the article entitled "The Role of Nonlinear Scalarization Functions in Characterizing Generalized Convex Vector Functions," present new characterizations of cone-convex and explicitly cone-quasiconvex vector functions with respect to a proper closed solid convex cone of a real linear topological space. These characterizations are given via classical convexity and explicit quasiconvexity of certain real-valued functions, defined using the nonlinear scalarization function.

M. Farid, in the paper entitled "The Subgradient Extragradient Method for Solving Mixed Equilibrium Problems and Fixed Point Problems in Hilbert Spaces," proposes and analyzes an iterative method based on hybrid methods and hybrid extragradient methods for finding a common solution of mixed equilibrium problems and fixed point problems of nonexpansive mappings in a real Hilbert space. The author shows that the sequences generated by the proposed iterative scheme converge strongly to a common solution of these systems.

D. Calogine, O. Chau, and P. Lauret, in the contribution "A Fractional Derivative Approach to Modelling a Smart Grid-off Cluster of Houses in an Isolated Area" present an operational model of an electrical power supply to meet the load of a cluster of houses in a remote mountainous area. For the model, different types of individual consumption and the available energy production are described, and energy management is modeled through a large mixed-integer linear programming problem. The authors make use of the fractional derivative in the model and provide encouraging numerical results.

Finally, we give our sincerest gratitude to all the authors who have contributed to this special issue and to the reviewers of the submitted contributions.

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