Special Issue: International Workshop on Nonlinear and Variational Analysis 2018

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Special Issue: International Workshop on Nonlinear and Variational Analysis 2018

The ‘International Workshop on Nonlinear and Variational Analysis 2018’ was held during 17–19 August 2018, at the Research Centre for Nonlinear Analysis and Optimization, Kaohsiung Medical University, Kaohsiung, Taiwan. During the workshop, inspiring keynote speeches along with several research presentations by highly esteemed experts provided an excellent setting for presenting novel results, exchanging ideas and developing new research collaborations.

On the occasion of this successful event, this special issue of *Optimization* presents advances in the growing research areas in optimization from the theoretical as well as from the application point of view. In particular, this special issue addresses different areas of applied analysis and optimization theory, recent results in nonlinear analysis, variational analysis, optimal control, fixed point theory and corresponding applications. Below we summarize the novel contributions of the finally chosen manuscripts.

The exciting contribution ‘A vector auxiliary principle technique approach to systems of mixed vector equilibrium problems’ by X. Zhao, O. Chadli and A. Saidi deals with a system of generalized mixed vector equilibrium problems involving set-valued variational-like inequalities (SGMVEP, in short) in the general setting of Banach spaces. First, the authors construct an associated vector auxiliary problem and establish existence results for it. This leads to the generation of an iterative algorithm for solving SGMVEP. Then, under weaker assumptions, the strong convergence of the proposed algorithm is established. The method adopted is based on the vector auxiliary principle and the obtained results improve some existing results in the literature.

In the paper entitled ‘Weak and strong convergence of splitting algorithms in Banach spaces’, the authors J.-C. Yao, X. Qin and S. Y. Cho discuss accretive and nonexpansive operators based on two iterative algorithms. Strong and weak convergence theorems of common solutions are established in the framework of uniformly convex and \( q \)-uniformly smooth Banach spaces.

The article ‘Gradient methods with selection technique for the multiple-sets split feasibility problem’ by M. Postolache, Y. Yao and Z. Zhu presents two new iterative algorithms for approximating a solution of the multiple-sets split feasibility problem. The suggested algorithms are based on the gradient method with selection technique. Weak and strong convergence theorems are demonstrated.
The paper ‘On a hyperbolic equation on a geometric graph with hysteresis type boundary conditions’ by C.-F. Wen, M. Kamenskii, Y.-C. Liou and M. Zvereva investigate the initial boundary value problem describing the oscillation process on a geometric graph with hysteresis type boundary conditions. Interestingly, the authors succeeded to obtain the analogue of the d’Alembert formula.

The manuscript ‘Optimality conditions and total dualities for conic programming involving composite function’, authored by D. Fang and Y. Zhang, concerns the study of a new class of conic programming with objectives given as the difference of a composite function and a convex function. The authors first introduce two new notions of regularity conditions in terms of the subdifferential of the involving functions. Under the new regularity conditions, some necessary and/or sufficient conditions for KKT type optimality conditions to hold are provided. Similarly, saddle point theorems and total Lagrange dualities for conic programming are also given.

In the paper ‘Set convergence of a non-convex vector optimization problem with variable ordering structure’ by W. Yu, X.-B. Li and Y.-C. Liou, the authors establish the convergence of a non-convex vector optimization problem, which is a quasiconnected vector optimization problem with respect to the perturbation of feasible set, objective function and ordering cone. To obtain the convergence results of this problem, first, the Kuratowski–Painlevé convergence of (weak) minimal point set for a sequence of cone-sectionwise connected sets with variable order structures to that of a given cone-sectionwise connected set is studied, and then the Kuratowski–Painlevé convergence of the sets of (weak) minimal points and (weak) efficient points for perturbed optimization problems to those of a given problem are investigated. Several numerical examples are also given to illustrate the main results and compare these results with the corresponding ones of the recent references.

The manuscript ‘Nonsmooth integral guiding potentials and asymptotic behaviour of solutions for inclusions with causal multioperators’, authored by S. Kornev, V. Obukhovskii and J.-C. Yao, offers insight into the study of differential inclusions with a causal multioperator. The authors apply the method of nonsmooth integral guiding potentials to the study of the problem on the asymptotic behaviour of solutions for such inclusions. Both the case of a closed and convex-valued right-hand part and the case of a non-convex-valued and lower semicontinuous right-hand part are considered and investigated.

In the paper ‘Parallel proximal point methods for systems of vector optimization problems on Hadamard manifolds without convexity’ by X. Qin, L.-C. Ceng and X. Li, the authors present the local weak Pareto optimality conditions for nonsmooth vector optimization problems on Hadamard manifolds. Some convergence results of the parallel proximal point algorithms for finding a solution of vector optimization problems are established.

The manuscript ‘Differential stability of convex optimization problems under weaker conditions’, authored by M. A. Köbis, D. T. V. An and N. V. Tuyen,
concerns the study of differential stability properties of convex optimization problems in Hausdorff locally convex topological vector spaces. New formulas for the subdifferential and the singular subdifferential of the optimal value function of convex optimization problems are derived. Namely, instead of using the traditional Moreau–Rockafellar Theorem, the authors employ a sum rule for subdifferentials of two convex functions from the work of Correa, Hantoute, and López [Weaker conditions for subdifferential calculus of convex functions. J Funct Anal. 2016;271:1177–1212]. Detailed comparisons with some known results are also given in this paper.

Finally, the paper ‘Tikhonov type regularization methods for inverse mixed variational inequalities’ by J. Chen, X. Ju, E. Köbis and Y.-C. Liou concludes this special issue. In this work, the authors focus on a Tikhonov type regularization method for inverse mixed variational inequalities. Existence of solutions of the inverse mixed variational inequalities and its regularized problem are established. The authors also present the relationships among three coercivity conditions for inverse mixed variational inequalities. Finally, the nonemptiness and boundedness for the solutions set of the regularized problem are derived under some mild conditions.

We, as guest editors, herewith take this opportunity to thank all authors who contributed to this special issue and all reviewers who kindly accepted the invitation to provide their expertise and gave constructive comments. Moreover, we are truly grateful to the Editor in Chief of ‘Optimization: A Journal of Mathematical Programming and Operations Research’, Prof. Dr Christiane Tammer, for the editorial opportunity to organize this special issue.

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