

## Editorial

# Some Recent Trends in Variational Inequalities and Optimization Problems with Applications

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Variational inequalities theory, which was introduced in the sixties, has emerged as an interesting and fascinating branch of applicable mathematics with a wide range of applications in industry, finance, economics, social, and pure and applied sciences. This field is dynamic and is experiencing an explosive growth in both theory and applications; as a consequence, research techniques and problems are drawn from various fields. The ideas and techniques of variational inequalities are being applied in a variety of diverse areas of sciences and prove to be productive and innovative. It has been shown that this theory provides the most natural, direct, simple, unified, and efficient framework for a general treatment of a wide class of unrelated linear and nonlinear problems. Variational inequalities have been extended and generalized in several directions using novel and new techniques. In parallel, optimization methods based on proximal point and proximal-like type methods have attracted a large number of researchers in the last three decades. In the same spirit, we can cite, for instance, the alternating direction multipliers method, which is based on the augmented lagrangian algorithm, which itself can be seen as a direct application of the proximal point algorithm to the dual problem of a constrained optimization problem.

The aim of this special issue is to present new approaches and theories for variational inequalities arising in mathematics and applied sciences. This special issue includes 14 high-quality peer-reviewed papers that deal with different aspects

of variational inequalities. These papers contain some new, novel, and innovative techniques and ideas. We hope that all the papers published in this special issue can motivate and foster further scientific works and development of the research in the area of theory, algorithms, and applications of variational inequalities.

The summaries of the 14 papers in this issue are listed as follows.

The paper of C. Chen et al. considers a class of linearly constrained separable convex programming problems without coupled variables. They weaken some conditions to obtain convergence of the alternating direction method of multipliers and they propose also a relaxed ADMM involving an additional computation of optimal step size and establish its global convergence under mild conditions.

The paper of H. Sun and Y. Wang revisits the global error bound for the generalized nonlinear complementarity problem over a polyhedral cone (GNCP) and sharpens the global error bound for the GNCP under weaker conditions, which improves the existing error bound estimation for the problem.

The paper of M. Ma concerns the design and the convergence analysis of algorithms to split variational inequality and equilibrium problems.

The paper of Y. Wang and C. Wang gives a new modified Ishikawa type iteration algorithm for common fixed points of total asymptotically strict pseudocontractive semigroups.