

## Editorial

# Theory and Algorithms of Variational Inequality and Equilibrium Problems, and Their Applications

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The variational inequality problem is a general problem formulation that encompasses many mathematical problems, among others, including nonlinear equations, optimization problems, complementarity problems, and fixed point problems. Variational inequality is developed as a tool for the study of certain classes of partial differential equations, economic equilibrium problems, and the pricing model of the option.

Equilibrium problems provide a mathematical framework which includes optimization, variational inequalities, fixed point and saddle point problems, and noncooperative games as particular cases. It has received an increasing interest mainly because many theoretical and algorithmic results developed for one of these models can be often extended to the others by using the unifying language.

Because of the importance and active impact of variational inequality and equilibrium problem in the nonlinear analysis and optimization, this special issue, focusing on most recent contributions, includes works on hemivariational inequality and multivalued variational inequality, the well-posedness and stability of equilibrium problems, the basic methods for showing the existence of solution of the equilibrium problem, the iterative approximations, and some applications to the abstract economy and portfolio selection, which are based on a strict international peer review procedure and our original proposal. A brief review of the papers is given as the following five topics.

### (I) Variational Inequality and Complementarity Problem

- (i) In the paper titled “On a class of variational-hemivariational inequalities involving upper semicontinuous set-valued mappings,” G. Tang et al. apply the various coercivity conditions to show the existence of solutions and boundedness of the solution set for the variational-hemivariational inequalities involving upper semicontinuous set-valued mappings.
- (ii) In the paper titled “A new system of multivalued mixed variational inequality problem,” Xi Li and Xue-song Li construct a perturbational  $f$ -projection algorithm for solving a system of multivalued mixed variational inequality problem and prove the existence of solutions and the convergence of iterative sequences.
- (iii) In the paper titled “An improvement of global error bound for the generalized nonlinear complementarity problem over a polyhedral cone,” H. Sun et al. study an easier computed global error bound for the generalized nonlinear complementarity problem over a polyhedral cone.

### (II) Well-Posedness and Stability of Equilibrium Problems

- (i) In the paper titled “Levitin-Polyak well-posedness of an equilibrium-like problem in Banach spaces,” R. Deng discusses the Levitin-Polyak well-posedness of