Editorial

Recent Development in Fixed-Point Theory, Optimization, and Their Applications

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This special volume was originally conceived to provide authors and readers a publication to present the most recent advances in the study of applications of various fixed point theorems. Since 1909, when Luitzen Brouwer proved the first fixed point theorem named after him, fixed point theory has played very important roles in many different fields. We can find a lot of demonstrations in optimization theory, approximation theory, differential equations, variational inequalities, complementary problems, equilibrium theory, game theory, economics theory, and so forth.

Fixed point theorems are developed for single-valued or set-valued mappings of metric spaces, topological vector spaces, posets and lattices, Banach lattices, ... Among the themes of fixed point theory, the topic of approximation of fixed points of mappings is particularly important because it is useful for proving the existence of fixed points of mappings. It can be applied to prove the solvability of optimization problems, differential equations, variational inequalities, and equilibrium problems.

Due to the importance of and the high volume of active research in the nonlinear analysis and optimization and, in particular, many new tools in studying them involving fixed point approximations, it is worthwhile to publish a special issue on this topic to highlight the recent advances in this field.

The selection of the papers included in this volume, which has been based on a strict international peer review procedure, contains a representative list of papers with newfangled results which covers the different topics considered in our original proposal.

In the papers in this special issue, the following topics are discussed.

(i) General nonlinear analysis theory and applications:

> "*Applications of Bregman-Opial property to Bregman nonspreading mappings in Banach spaces*," by E. Naraghirad et al.;
> "*Application of extended homotopy analysis method to the two-degree-of-freedom coupled van der pol-duffing oscillator*" by Y. H. Qian et al.;
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> "*The hierarchical minimax inequalities for set-valued mappings,*" by Y.-C. Lin, and C.-T. Pang.

(ii) Variational inequalities, optimization problems, complementarity problems, and equilibrium problems:

> "*Generalized equilibrium problems related to Ky Fan inequalities*" by I. Roventa;
> "*Strong convergence theorems for solutions of equilibrium problems and common fixed points of a finite family of asymptotically nonextensive nonself mappings*" by L. Zhang et al.;
> "*Bregman f-projection operator with applications to variational inequalities in banach spaces*" by C.-T. Pang et al.