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Editorial

Advances in Nonlinear Analysis and Optimization

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We are pleased to announce the completion of this special issue. This special issue was opened in late August of 2012 and closed in late May of 2013. There were 39 submissions in total and 11 out of them were accepted after strict reviews.

The topics of these eleven articles cover from theoretical sides to real applications. In this special issue, we focus on the connection between nonlinear analysis and optimization, which has been a trend during the past two decades. With the tool of nonlinear analysis, various reformulations for optimization problems and techniques in analyzing convergence of algorithms have achieved new and rich directions. Furthermore, some of them lead to real applications. These are what we want to present to the public in this special issue.

The article by Y. H. Kang et al. studies an optimal harvesting for a nonlinear age-spatial-structured population dynamic model, where the dynamic system contains an external mortality rate depending on the total population size. Related properties of solutions are investigated. Their results can be further applied to an optimal harvesting for some realistic biological models.

The article by S. Kum and Y. Lim provides a further development of the geometric mean of convex functions. A new algorithmic self-dual operator for convex functions is proposed and its essential properties are investigated.

The article by J. Zhou et al. studies the set-valued complementarity problems which pose rather different features from those that classical complementarity problems hold. Solution set is analyzed, and properties of merit function for such complementarity problems including level bounded set property and error bounds are investigated.

The article by H. Qinghai and Z. Binhin studies the positive definiteness of high-order subdifferential and high-order optimality conditions in vector optimization problems. The authors obtain a new Taylor's formula in terms of the $k + 1$-order subdifferential. In addition, the $k + 1$-order optimality conditions for strongly C-quasiconvex functions are investigated.

The article by S. M. Kang et al. establishes a new second-order iteration method for solving nonlinear equations. The authors show the efficiency of their method compared to some methods in the literature. They also point out that their method can be considered for functional equations and system of nonlinear equations.

The article by L. Kong et al. studies the low-rank matrix recovery problem, which is generally NP hard. This kind of problem is a rank minimization problem subject to linear equality constraints, and it arises in many fields such as signal and image processing, statistics, computer vision, and system identification and control. The authors characterize the concept of s-goodness for a sensing matrix in sparse signal recovery, which can be viewed as a necessary and sufficient condition for exact s-rank matrix recovery.

The article by J. Song and S. He studies the nonfragile robust finite-time control problem for a class of nonlinear uncertain systems with uncertainties and time delays being considered. A finite-time controller is designed, and simulations illustrate the validity of the proposed approach.

The article by J. Shen et al. studies an approximate Quasi-Newton Bundle-type method for nonsmooth optimization.

Under some reasonable assumptions, they show that the proposed method holds a Q-superlinear rate of convergence.

The article by G.-G. Wang et al. studies a simulated annealing-based krill herd method for global optimization. To enhance the performance of this method, the authors propose a new improved metaheuristic and simulated annealing-based krill herd algorithm for solving optimization tasks within limited time. The merits of these improvements are verified by benchmark problems.

The article by Y. Narushima et al. studies a smoothing method with appropriate parameter control based on Fischer-Burmeister function for second-order cone complementarity problems. Basically, they reformulate the complementarity problems as a nonsmooth system of equations, and a smooth Newton method is constructed accordingly. The authors also show the global and quadratic convergence of their method.

The article by K.-Y. Wu et al. studies optimal scheduling for retrieval jobs in double-deep by evolutionary algorithms. More specifically, three types of evolutionary algorithms, the genetic algorithm (GA), the immune genetic algorithm (IGA), and the particle swarm optimization (PSO) algorithm, are implemented to obtain the optimal assignments. Simulations and comparisons show the advantages and feasibility of the proposed methods.

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