Editorial

Advance in Nonlinear Analysis: Algorithm, Convergence, and Applications

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We are glad to achieve this special issue. This special issue was opened in late November of 2012 and closed in early April of 2013. There were 72 submissions in total and 27 of them were accepted for publication after strict reviews, which gave important developments in nonlinear analysis and its applications. The accepted rate of papers is 37.5 percent.

The topics of the accepted 27 articles cover the area from theory to real applications. This special issue mainly concentrates on some latest developments in nonlinear analysis and its applications with a particular emphasis. With the help of linear and nonlinear functional analysis, various algorithms and their analyzed techniques of convergence presented some new methods of solving some nonlinear problems. Moreover, some of them gave real applications and numerical examples. These are our main aims of sponsoring this special issue.

The article by Y. Ren et al. studies the common fixed point theorems for nonlinear contractions in dislocated metric spaces. The article by F. Gu and Y. Yin proved a common fixed point theorem for three pairs of weakly compatible self-maps satisfying a new contractive condition in the framework of a generalized metric space by means of the common (E, A) property. The article by M. De la Sen showed fixed points and best proximity points of a class of the so-called generalized point-dependent (K, λ)-hybrid p-cyclic self-mappings relative to a Bregman distance and obtained the weak convergence results of certain average sequences.

The article by Y. Dang and Y. Gao proposed an inertial iterative algorithm for solving the split common fixed-point problem for quasinonexpansive mappings and proved the asymptotical convergence of the algorithm under some suitable conditions. The article by N. Hussain et al. introduced a new iterative scheme called Jungck-CR iterative scheme and studied the stability and strong convergence of this iterative scheme for a pair of nonself-mappings. The article by S. Wang and S. M. Kang introduced the concept of Bregman asymptotically quasinonexpansive mappings and constructed an iterative scheme to find a common element of the set of solutions of an equilibrium problem and the set of common fixed points of a countable family of Bregman asymptotically quasinonexpansive mappings in reflexive Banach spaces. The article by Y. Wang and W. Xuan some strong convergence theorems for a common fixed point of a finite family of relatively nonexpansive mappings by using a new hybrid iterative method in mathematical programming and the generalized projection method in a Banach space.

The article by H. Zegeye and N. Shahzad introduced an iterative process and proved that the iterative sequence converged strongly to solutions of a certain variational inequity problem for η-inverse strongly accretive mappings in the set of common fixed points of finite family of strictly pseudocontractive mappings in Banach spaces. The other article by the same authors studied an iterative process which converges strongly to a zero of a finite sum of monotone mappings. The article by H. Du obtained the strong convergence of modified Mann-Halpern algorithms for finding the fixed points of pseudocontractive mappings. The article by J. S. Jung showed strong convergence of an iterative sequence defined by a continuous pseudocontractive mapping and a continuous bounded strongly pseudocontractive mapping.

The article by Y.-Y. Chen and S.-Q. Du considered three kinds of nonlinear conjugate gradient methods with Wolfe type line search for unstrained optimization problems and showed the global convergence results and the numerical results. The other article by the same authors continued to study a new smoothing nonlinear conjugate gradient method for nonsmooth equations with finitely many maximum functions. The article by Y. Qiu et al. presented a hybrid spectral conjugate gradient method for large-scale unconstrained optimization, which possesses a self-adjusting property and established global convergence result under the standard Wolfe conditions. The article by G. Yu et al. combined multivariate spectral gradient method with projection scheme to present an adaptive prediction-correction method for solving large-scale nonlinear systems of monotone equations.

The article by M. F. Abad et al. considered two iterative methods of order four and five for solving nonlinear systems of equations and made the numerical comparisons with other existing second- and fourth-order schemes to solve the nonlinear system of equations of the Global Positioning System and some academic nonlinear systems. The article by C. Mu et al. dealt with the extinction and nonextinction properties of the fast diffusion equation of homogeneous Dirichlet boundary condition and showed that the solution either extinct or nonextinct in finite time depends strongly on the initial data and the first eigenvalue the diffusion equation of homogeneous Dirichlet boundary condition.

The article by Z. Wang et al. studied an autonomy system with time-delayed feedback by using the theory of functional differential equation and Hassard's method and gave the conditions on which zero equilibrium exists and Hopf bifurcation occurs. The article by J. Banaś and S. Dudek considered the solvability of some nonlinear functional integral equations in the Banach algebra of real functions that defined, continuous, and bounded on the real half-axis. The article by H. Yuan and Cheng Song introduced the stability and convergence of two-step Runge-Kutta methods with compound quadrature formula for solving nonlinear Volterra delay integrodifferential equations.

The article by R. Chen et al. reported the approximate split equality problem (ASEP) in the framework of infinite-dimensional Hilbert spaces, used the regularization method to establish a single-step iteration for solving the ASEP, and showed that the sequence generated by such algorithm strongly converges to the minimum-norm solution of the ASEP. The article by L. Y. Shi et al. proved Δ-convergence theorems of iterative sequences for asymptotically nonexpansive mappings in CAT(0) spaces.

The article by M. Şenol et al. applied the previously developed new perturbation-iteration algorithm to differential equation systems and gave an iteration algorithm. The article by D. Li et al. studied the existence and monotone iteration of solutions for a third-order four-point boundary value problem with p-Laplacian. The article by G. Dong et al. proved the existence, uniqueness, and comparison principle of the minimizer for the variational problem and established the existence, uniqueness, and long-time behavior of the associated evolution equation.

The article by C. Yang and Y. Liu discussed some operator inequalities on chaotic order about several operators, which are generalization of Furuta inequality and show monotonicity of related Furuta type operator function. The article by X. Hu and S. Zhang presented a new extension of Serrin's lower semicontinuity theorem and proved that the variational functional defined on $W^{1,1}_{\mathrm{loc}}(\Omega)$ is lower semicontinuous with respect to the strong convergence.

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