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Editorial

Iterative Fixed-Point Methods for Solving Nonlinear Problems: Dynamics and Applications

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The fixed-point operator plays a significant as well as remarkable role in the study of nonlinear phenomena occurring in engineering, physics, economics, life sciences, and medical sciences. The design of fixed-point iterative methods for solving nonlinear problems, in particular nonlinear equations or systems, has gained a spectacular development in the last two decades. Nevertheless, the existence of recent and extensive literature on these iterative schemes reveals that this topic is still a dynamic branch of the applied mathematics with interesting and promising applications.

In the recent years, the study of the dynamical behavior of the rational operator associated to an iterative method has also become a rapidly growing area of research, since the dynamical properties of the rational operator give us important information about the convergence, efficiency, and reliability of the iterative method.

This special issue was opened in April of 2014 and closed in September of 2014. There were 34 submissions in total and 13 of them were accepted for publication, after strict reviews, which gave important developments in iterative methods and their applications. The guest editors of this special issue hope that the presented results could outline new ideas for futures studies.

The purpose of this special issue was to explore the last advances in the field of fixed-point iterative methods for solving nonlinear problems and their applications in mathematics and applied sciences. The authors were invited to submit original research articles to stimulate the continuing efforts in nonlinear equations and related theories. The special issue provided a forum for researchers and scientists to communicate their recent developments and to present their novel results on nonlinear problems.

The topics of the accepted papers cover the area from theory to real applications. With the help of linear and nonlinear functional analysis tools and also helped by real and complex dynamical analysis, several methods and their corresponding convergence analysis have been presented for solving nonlinear problems. All of them gave numerous numerical tests and some of them real applications. We have the pleasure to present the selected manuscripts for this special issue.

R. Chugh and S. Kumar extended a previous result of D. Zhang et al. from two countable families to k countable families and prove weak and strong convergence results of two new multistep iterative processes to common fixed point of countable family of multivalued quasi-nonexpansive mappings in a uniformly convex Banach space.

Two manuscripts are devoted to the analysis of iterative methods for solving nonlinear equations. In "New Mono- and Biaccelerator Iterative Methods with Memory for Nonlinear Equations," the authors construct new iterative schemes with memory for solving nonlinear scalar equations of orders twelve and fourteen, by using accelerating parameters and needing only four functional evaluations per step. On the other hand, B. Campos et al. analyze the (α, c)-family of iterative procedures on quadratic polynomials under a dynamical point of view. The authors find some values of the parameters