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Editorial

Fuzzy Linear and Nonlinear Integral Equations: Numerical Methods

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Integral equations are one of the most useful mathematical tools in both pure and applied mathematics. They have enormous applications in many real problems. Many initial and boundary value problems associated with ordinary differential equation (ODE) and partial differential equation (PDE) can be transformed into problems of solving some approximate integral equations.

Indeed, modeling such problems using integral equations with the exact parameters is not only easy but also impossible in the real problems. For this purpose, one way is using some uncertainty measures for handling such lack of information. One of the most and recent approaches is using Zadeh's fuzzy concept. So, instead of using deterministic models, we provide fuzzy integral equations of both linear and nonlinear forms.

In fact, obtaining the exact solutions of such fuzzy integral equations is not possible in all cases because of the inherited restrictions form application of fuzzy concepts in these problems. So, in this special issue, we intend to consider the numerical methods to solve fuzzy integral equations and the related topics with real applications. These topics include fuzzy linear and nonlinear integral equations with numerical methods, investigating the convergence, stability, and consistency of numerical approaches, numerically modeling the real problems associated with numerical methods, considering the differences between deterministic and fuzzy numerical methods to solve fuzzy integral equations, numerically solving fuzzy differential equations of arbitrary order using the equivalence fuzzy integral equations, obtaining some approximations of the solutions via ranking approaches, and applications in real-world problems with numerical techniques.

Our special issue contains few papers in which different numerical techniques are employed. The paper "*A simplified Milstein scheme for SPDEs with multiplicative noise*" replaces the exponential term with a Padé approximation of order 1 and denotes the resulting scheme by simplified Milstein scheme. The paper "*On properties of pseudointegrals based on pseudoaddition decomposable measures*" discussed pseudointegrals based on a pseudoaddition decomposable measure. Particularly, the definition of the pseudointegral for a measurable function based on a strict pseudoaddition decomposable measure by generalizing the definition of the pseudointegral of a bounded measurable function was stated. The paper "*Quadrature rules and iterative method for numerical solution of two-dimensional fuzzy integral equations*" introduced some generalized quadrature rules to approximate two-dimensional, Henstock integral of fuzzy-number-valued functions. Also, it gave error bounds for mappings of bounded variation in terms of uniform modulus of continuity. Moreover, it proposed an iterative procedure based on quadrature formula to solve two-dimensional linear fuzzy Fredholm integral equations of the second kind (2DFFLIE2) and presented the error estimation of the proposed method. The paper "*On solution of integrodifferential equation with delay parameter by Sinc basis functions*" is considered. For this purpose, a numerical solution is obtained for an integrodifferential equation with an integral boundary