



Special Issue
Recent Trends in Theoretical Aspects and
Computational Methods in Differential and Difference
Equations

Preface

Firstly, in recognition of Professor I.P. Stavroulakis's significant contributions to nonlinear dynamics and systems theory, we include a Personage in Science to introduce his biographical sketch and scientific activities.

After that, the first paper, entitled "On stability of a second order integro-differential equation", obtains new stability condition for the second order integro-differential equation.

In the second paper, entitled "Application of extended Fan sub-equation method to generalized Zakharov equation", the extended Fan sub-equation method is applied to obtain exact analytical solutions of the generalized Zakharov equation.

The third paper, entitled "Lie group classification of a generalized coupled Lane-Emden-Klein-Gordon-Fock system with central symmetry", is concerned with the symmetry analysis of a generalized Lane-Emden-Klein-Fock system with central symmetry. Several cases for the non-equivalent forms of the arbitrary elements are obtained.

The fourth paper, entitled "Numerical solutions of fractional chemical kinetics system", studies the numerical solution of the fractional chemical kinetics model using the operational matrices of fractional integration and multiplication based on the Bernstein polynomials.

In the fifth paper, entitled "A recursive solution approach to linear systems with non-zero minors", a recursive algorithm is presented to solve linear system of differential equations which has advantage over other existing algorithms.

The sixth paper, entitled "Comparison of new iterative method and natural homotopy perturbation method for solving nonlinear time-fractional wave-like equations with variable coefficients", investigated a comparison between an iterative method which is presented by Daftardar and Jafari and natural homotopy perturbation method (NHPM) for solving nonlinear time-fractional wave-like equations with variable coefficients.

In the seventh paper, entitled "Mathematical analysis of a differential equation modeling charged elements aggregating in a relativistic zero-magnetic field", the authors analyze, in spaces of distributions with finite higher moments, discrete mass and momentum dependent equations describing the movement of charged particles (electrons, ions) aggregating and moving in a relativistic zero-magnetic field. The model is a combination of two processes (kinetic and aggregation), each of which is proven to be separately conservative.

The eighth paper, entitled “Oscillation of second order nonlinear differential equations with several sub-linear neutral terms”, is concerned with some new sufficient conditions for oscillation of all solutions of a class of second order differential equations with several sub-linear neutral terms.

The ninth paper, entitled “Approximate analytical solutions for transient heat transfer in two-dimensional straight fins”, studies the numerical solution of the problem on heat transfer in two dimensional straight fins. The three-dimensional differential transform method (3D DTM) is used to construct the approximate analytical solutions.

In the tenth paper, entitled “Complete symmetry and μ -symmetry analysis of the Kawahara-KdV type equation”, the ordinary and μ -symmetries methods are used for the Kawahara-KdV type equation.

The eleventh paper, entitled “A phase change problem including space-dependent latent heat and periodic heat flux”, investigated a mathematical model related to a problem of phase-change process with periodic surface heat flux and space-dependent latent heat. The homotopy analysis method has been used to acquire the solution to the problem.

In the last paper entitled “Dual phase synchronization of chaotic systems using nonlinear observer based technique” the dual phase synchronization is achieved using nonlinear state observer technique and stability theory. The Qi and Newton-Leipnik systems are considered during demonstration of dual phase synchronization.

We would like to express our warmest thanks to authors who submitted their papers to be considered for publication in this Special Issue. We highly appreciate the contributions from the reviewers for their careful and critical evaluation of the manuscripts. It is our pleasure to thank Professor A.A. Martynyuk, Editor-in-Chief of ND&ST, for his support and encouragement during the process of editing this Special Issue.

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