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Editorial

Complex Boundary Value Problems of Nonlinear Differential Equations 2014

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Complex boundary value problems of nonlinear differential equations have merged as an interesting and fascinating branch of applied mathematics and pure mathematics with a wide range of applications in industry, economics, biology, physics, chemistry, social, and pure and applied sciences. The aim of this special issue is to present new approaches and theories for solving complex boundary value problems of nonlinear differential equations arising in the relative field. This special issue includes 33 high quality peer-reviewed papers which deal with different aspects of nonlinear differential equations. These papers contain some new, novel, and innovative techniques and ideas. We hope that all the papers published in this special issue can motivate and foster further scientific works and development of the research in the area of theory and applications of nonlinear differential equations.

Here, we are very grateful to all the authors and reviewers of the papers for their excellent contributions.

In the following we summarize briefly the content of the special issue.

In the paper titled "*A new proof of central limit theorem for i.i.d. random variables*," the authors give a new proof of central limit theorem for independent identically distributed random variables by using the viscosity solution theory of partial differential equation.

In the paper titled "*Exit problems for jump processes having double-sided jumps with rational Laplace transforms*," the authors consider the two-sided first exit problem for a jump process having jumps with rational Laplace transform and derive the joint distribution of the first passage time to two-sided barriers and the value of process at the first passage time. As applications, the explicit expressions of the dividend formulae for barrier strategy and threshold strategy are presented.

In the paper titled "*Dynamic analysis and chaos of the 4D fractional-order power system*," the authors study the dynamic analysis of a fractional-order power system with parameter Q1 and firstly report about bifurcation analysis of the fractional order power system. In this work, the authors also discuss the dynamic analysis with different fractional order and different parameters and establish its numerical simulations which are provided to demonstrate the feasibility and efficacy of the analysis.

In the paper titled "*Pricing of American put option under a jump diffusion process with stochastic volatility in an incomplete market*," the authors study the pricing of American options in an incomplete market in which the dynamics of the underlying risky asset are driven by a jump diffusion process with stochastic volatility. By employing a risk-minimization criterion, the authors obtain the Radon-Nikodym derivative for the minimal martingale measure and consequently a linear complementarity problem for American option price. An iterative method is then established to solve the LCP