Advances in Mathematical Physics

Special Issue on
Theoretical and Computational Advances in Nonlinear Dynamical Systems 2018

CALL FOR PAPERS

The theory of dynamical systems is a paradigm for studying various scientific phenomena, ranging from complex atomic lattices to planetary motion, from water waves to weather systems, from chemical reaction to biological behaviors, and many more. Relevant applications have widely arisen in multidisciplinary fields, including mathematics, physics, chemistry, biology, and even economics and sociology.

Due to the rapid development of theoretical and computational techniques in recent years, the role of nonlinearity in dynamical systems has attracted increasing interest and has been intensely investigated. Typical research areas include spatial and temporal evolution of nonlinear systems, pattern formation and their interactions, and localized solutions and stability analysis. At the same time, the mathematical tools, for both of the symbolic and numerical aspects, have been developed in dealing with the nonlinear dynamical systems qualitatively and quantitatively. On the other hand, complexity of the nonlinear dynamical systems can be further portrayed when chaotic and stochastic behaviors are revealed. Interplay between nonlinearity and randomness is also a highlight topic, which can be simulated and studied by modern computational resources.

Potential topics include but are not limited to the following:

- ▶ Nonlinear dynamics of continuous and discrete systems
- ▶ Integrable equations and exact solutions
- ▶ Symmetry and conservation laws
- ▶ Solitons and vortices
- ▶ Chaos, resonances, and stability analysis
- ▶ Interplay of nonlinearity and randomness
- ▶ Symbolic and numerical methods
- ▶ Fluid dynamics and Bose-Einstein condensates
- ▶ Nonlinear photonics and circuits

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