

## Editorial

# Uncertain Dynamical Systems 2014

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The theory and applications of uncertain dynamical systems have become an active research subject in nonlinear science and have attracted more attention in many fields. The methods used in the investigation of their solutions and their wide applications have gained considerable popularity, mainly due to their demonstrated applications to many real-world phenomena studying in physics, mechanics, chemistry, engineering, finance, and so forth.

In 2013, we edited this special issue in which original research articles as well as review articles focused on the latest achievements in uncertain dynamical systems and their applications have been invited. The interest to the announced Issue was enormous. We received many interesting results that addressed theoretical and applicable problems and published 16 outstanding contributions. Since the publication of the Issue, the theory of dynamical systems undergoes rapid development and many uncertain models have been introduced in science and engineering. Motivated by the above, the Editorial Board invited us to produce an annual issue on uncertain dynamic systems.

This special issue offers recent developments in the theory and applications of uncertain dynamical systems. In it, twelve manuscripts that deal with some aspects of systems under uncertainties are published.

Six papers are dedicated to some theoretical and control results for systems under different types of uncertainties. The paper of W. Xiang and X. Liu presented an adaptive fuzzy sliding mode control design for a class of uncertain horizontal platform systems. The boundedness and convergence properties of two general iterative processes which involve

sequences of self-mappings on either complete metric or Banach spaces are investigated by M. De la Sen and A. Ibeas. In their paper, the sequences of self-mappings considered in the first iterative scheme are constructed by linear combinations of a set of self-mappings, with each of them being a weighted version of a certain primary self-mapping on the same space. The paper of M. S. Al-Muhja presented a Korovkin-type approximation theorem for a sequence of positive linear operator defined on the space of all real valued continuous and periodic functions via A-statistical approximation, for the rate of the third-order Ditzian-Totik modulus of smoothness. The article authored by Q. Xi and J. Si offers some new existence, uniqueness, and stability results for neural networks with mixed time delays and generalized activation functions under impulsive perturbations. The practical stability problem for impulsive discrete systems with time delays is studied by L. Sun et al. An adaptive backstepping controller is constructed for a class of nonaffine nonlinear time-varying delay systems in strict feedback form with unknown dead zone and unknown control directions in the paper of W.-D. Zhou et al. Owing to the universal approximation property, fuzzy logic systems are employed to approximate the uncertain nonlinear part in controller design process.

In six papers, some applicable problems related to uncertain dynamic systems are presented. Dynamics characteristics of closed-loop supply chain using repeated game theory and complex system theory are studied by J. Ma and Y. Guo. In their paper, they established decentralized decision-making game model and centralized decision-making game model

and analyzed the corresponding continuity system. The paper of S. Nikitenkova and E. Pelinovsky investigated the dynamics of the surface heterogeneities formation in low-dimensional phononic crystals and proved that phononic transverse perturbations in this medium are highly nonlinear. The global asymptotic robust stability of equilibrium for neutral-type hybrid bidirectional associative memory neural networks with time-varying delays and parameters uncertainties is considered by W. Feng et al.

W. Cheng and J. Wang developed a random financial time series model of stock market by a stochastic contact interacting system. They studied the statistical behaviors of return time series and the corresponding behaviors of returns for Shanghai Stock Exchange Composite Index (SSECI) and Hang Seng Index (HSI). In the paper of J. Ma and B. Chen, a complex uncertain analysis of some realistic recycle fields in China is made. Finally, Y. Zeng et al. proposed a practical multiobjective joint replenishment and delivery scheduling model with deterministic demand and fuzzy cost. The model is formulated by using inverse weight fuzzy nonlinear programming method.

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