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Editorial

Stability and Bifurcation Analysis of Differential Equations and Its Applications

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Starting from Poincaré's qualitative theory and Lyapunov's stability theory of a dynamical system, stability and bifurcation theory has undergone a prodigious development. Stability and bifurcation theory of differential equations is relatively a mature research area, yet it has seen rapid developments in recent years. These advances have led to broad applications in many fields, such as physics, engineering, biology, neuroscience, economics, and even life and social sciences.

It is well known that delay is typically a primary source of oscillatory behaviour in delay differential equations and diffusion often causes Turing instability and becomes a primary source of spatial dynamics in reaction-diffusion equations. Therefore, we have targeted these topics in this special issue. The special issue received tremendous response from the researchers in this research field. So far, we have received 124 papers, which contribute to the research field with the infusion of new ideas and methods. All papers submitted to this special issue went through a rigorous peer-review process. Based on the reviewers' reports, we have carefully selected 48 original research papers for publication, which contain the delay-induced instability, stability switches, and Hopf bifurcations in delay differential equations; nonlinear instability, bifurcations, and blow-up solutions and travelling wave solutions in the reaction-diffusion equations; and almost periodic solutions in the stochastic differential equations.

It is impossible to collect all recently important advances in the field of bifurcation theory of differential equations by

a single special issue. But we believe that the papers to be published in this special issue can at least partially reflect some new advances and ideas in the field and do hope this special issue can influence the research field of bifurcation theory of differential equations in future.

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