



Editorial

Special Issue: Bifurcation analysis, dynamic simulation, and mathematical physics

Guest editors: Lixia Duan¹, Pengcheng Xiao^{2,*} and Jianzhong Su³

¹ North China University of Technology, China

² Department of Mathematics, Kennesaw State University, USA

³ University of Texas at Arlington, Arlington, Texas 76019, USA

* **Correspondence:** Email: duanlx@ncut.edu.cn, pxiao4@kennesaw.edu, su@uta.edu.

The special issue webpage is available at: <http://www.aimspress.com/era/article/6448/special-articles>.

This special issue of Electronic Research Archive presents 29 papers devoted to the study of nonlinear and complex dynamical systems, spanning topics from neuronal and immune systems to models in mathematical physics and engineering. These works reflect the common mathematical challenges of bifurcation, stability, oscillations, stochastic noise, and parameter estimation that arise across disciplines.

The contributions highlight three main directions. First, neuronal models explore mechanisms of synchronization, oscillation, and pathological dynamics in brain networks. Second, biomedical and immune system studies address tumor–immune interactions, infectious diseases, and wound healing processes, emphasizing nonlinear feedback and instabilities. Finally, several articles investigate bifurcation and chaotic phenomena in physics and engineering, illustrating the broad applicability of dynamical systems methods.

We sincerely thank the authors for their high-quality submissions, the reviewers for their careful evaluations, and the ERA editorial team for their invaluable support. We hope this collection will serve as a valuable resource and inspiration for future research in the analysis and applications of nonlinear dynamical systems.

