



Bifurcation and Chaos in Fractional-Order Systems

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Message from the Guest Editors

The concept of fractional differentiation first emerged in 1965 in a historical correspondence between the Marquise de L'Hospital and mathematician Leibnitz. In the sequel, mathematicians such as Euler, Laplace, Abel, Liouville, and Riemann further developed essential technical details. It was realized recently that many scientific phenomena with complex dynamics cannot be well modeled by differential equations using integer-order derivatives. As a result, there has been an increasing interest to merge the mathematical fundamentals of fractional calculus into scientific and engineering applications. Till now, many theoretical and technical problems remain to be further explored, including particularly fractional-order chaotic systems. On the other hand, finding hidden attractors in continuous-time and discrete-time fractional-order chaotic systems represents a new trend of research. Of particular interest are those systems with symmetry. Therefore, this research direction of bifurcation and chaos in fractional-order dynamical systems opens up a corpus of opportunities with great promises in such scientific fields as complex dynamics, systems and networks, to name a few.





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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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