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Chaos in the fractional order periodically forced complex Duffing's oscillators. (English)

Zbl 1088.37046

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Summary: The occurrence of fractional-order chaotic dynamics have been intensively studied over the last ten years in a large number of real dynamical systems of physical nature. However, a similar study has not yet been carried out for fractional-order chaotic dynamical systems in the complex domain. In this paper, we numerically study the chaotic behaviors in the fractional-order symmetric and nonsymmetric periodically forced complex Duffing's oscillators. We find that chaotic behaviors exist in the fractional-order periodically forced complex Duffing oscillators with orders less than 4. Our results are validated by the existence of positive maximal Lyapunov exponent.

MSC:

- [37N05](#) Dynamical systems in classical and celestial mechanics
- [34C15](#) Nonlinear oscillations and coupled oscillators for ordinary differential equations
- [70K55](#) Transition to stochasticity (chaotic behavior) for nonlinear problems in mechanics

Cited in **39** Documents

Keywords:

fractional-order chaotic dynamical systems in the complex domain; periodically forced complex Duffing's oscillators; maximal Lyapunov exponent

Software:

Sprott's Software

Full Text: [DOI](#)

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