Synchronization methods for chaotic systems involving fractional derivative with a non-singular kernel.

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Abstract

This study considers the problem of control-synchronization for chaotic systems involving fractional derivative with a non-singular kernel. Using an extension of the Lyapunov Theorem for systems with Atangana-Baleanu-Caputo (ABC) derivative, a suitable control scheme is designed to achieve matrix projective synchronization (MP) between nonidentical ABC systems with different dimensions. The results are exemplified by the ABC version of the Lorenz system, Bloch system, and Liu system. To show the effectiveness of the proposed results, numerical simulations are performed based on the Adams-Bashforth-Mounlton numerical algorithm.

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(a)

(b)

(c)

(d)

(e)

(f)