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Robust Adaptive Control for Fractional-Order Financial Chaotic Systems with System Uncertainties and External Disturbances

Heng Liu
Department of Applied Mathematics, Huainan Normal University, Huainan 232038, China
College of Mathematics and Information Science, Shaanxi Normal University, Xi'an 710119, China
Shenggang Li
College of Mathematics and Information Science, Shaanxi Normal University, Xi'an 710119, China
e-mail: shengganglinew@126.com
Guanjun Lia, Hongxing Wang
Department of Applied Mathematics, Huainan Normal University, Huainan 232038, China

Corresponding author: shengganglinew@126.com

In this paper, robust adaptive control for uncertain fractional-order financial chaotic systems with bounded unknown external disturbances is studied. By utilizing the fractional-order extension of the classical Lyapunov stability methods, an adaptive controller is presented for controlling the fractional-order financial chaotic system. Quadratic Lyapunov functions are employed in the stability analysis, and fractional-order adaptation laws are designed to update controller parameters online. The proposed controller can ensure that the system states converge to the origin asymptotically and all signals in the closed-loop system remain bounded. Finally, simulation results are presented to confirm our theoretical results.

KEYWORDS: Robust control, fractional-order financial system, fractional-order chaotic system, fractional-order adaptation law.