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Adaptive Control for the Stabilization, Synchronization and Anti-Synchronization of New Chaotic System with a Line Equilibrium

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Abstract: This paper derives new results on the adaptive control, synchronization and anti-synchronization for the new chaotic system with a line equilibrium when the system's parameters are unknown. Firstly, we construct an adaptive controller to stabilize the new chaotic system to its unstable equilibrium at the origin. Then, we construct an adaptive controller to synchronize the new identical chaotic systems with unknown parameters. Finally, the corresponding adaptive controller to realize the anti-synchronization is also constructed for the same new identical chaotic systems. The Lyapunov stability theory and adaptive control theory have been applied to prove all the control, synchronization and anti-synchronization results derived in this paper. Numerical simulations have been presented to illustrate the main results for the new chaotic system with a line equilibrium.

Keywords: *chaos control; adaptive control; synchronization and anti-synchronization; Lyapunov stability theory.*

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