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Yan Wu* (yan@georgiasouthern.edu), Department of Mathematical Sciences, P.O. Box 8093, Statesboro, GA 30460. *Stability Analysis of Wavelet-Controlled Dynamical Systems.*

Compactly supported wavelets have certain properties that are useful for controller design. We explore the mechanism of a wavelet controller by integrating the wavelet controller with linear time-invariant systems (LTI). A necessary condition for an effective wavelet-based control is that the footprints of the wavelet network cover the state space where the state trajectories stay. Closed-form bounds on the design parameters of a wavelet controller are derived, which guarantee local asymptotic stability of wavelet-controlled LTI systems. Wavelet network is also effective in adaptive control of chaotic systems when there are uncertainties with the system. In this case, global stability of wavelet-control Lorenz system along with classical state feedback control is investigated. (Received August 17, 2010)