World Academy of Science, Engineering and Technology
International Journal of Electrical and Computer Engineering
Vol:11, No:07, 2017

Design Fractional-Order Terminal Sliding Mode Control for Synchronization of a Class of Fractional-Order Chaotic Systems with Uncertainty and External Disturbances

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Abstract : This paper presents a new fractional-order terminal sliding mode control for synchronization of two different fractional-order chaotic systems with uncertainty and external disturbances. A fractional-order integral type nonlinear switching surface is presented. Then, using the Lyapunov stability theory and sliding mode theory, a fractional-order control law is designed to synchronize two different fractional-order chaotic systems. Finally, a simulation example is presented to illustrate the performance and applicability of the proposed method. Based on numerical results, the proposed controller ensures that the states of the controlled fractional-order chaotic response system are asymptotically synchronized with the states of the drive system.

Keywords : terminal sliding mode control, fractional-order calculus, chaotic systems, synchronization
Conference Title : ICCAR 2017 : International Conference on Control, Automation and Robotics
Conference Location : Zurich, Switzerland
Conference Dates : July 27-28, 2017