STOCHASTIC ADAPTIVE CONTROL AND SYNCHRONIZATION OF CHAOTIC DYNAMICAL SYSTEMS

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Abstract

In this work, we show that for chaotic systems, adaptive control and synchronization could be achieved in a physical sense when the white noise is associated multiplicatively with the adaptive control or coupling term. We not only give numerical simulations but also provide a rigorous validation for our findings by using the theory of stochastic analysis. Moreover, we find similar results on a positive role of white noise in discrete dynamical systems. We believe that all the results could be further generalized to the case where complex dynamical networks with stochastic adaptive couplings are considered.

Key words

Chaos, synchronization, adaptive control, white noise