



Dissipative Analysis and Stability of Nonlinear Stochastic State-Delayed Systems

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Abstract: In this paper, we extend the concept of dissipativeness developed for nondelay deterministic systems to stochastic state-delayed systems with Markov jump disturbances. We give necessary and sufficient conditions for the system to be dissipative and to have finite \mathcal{L}_2 -gain also known as the bounded-real condition. Finally, we discuss the relationship between the dissipativeness of the system, its \mathcal{L}_2 -gain, and its stochastic stability.

Keywords: *Nonlinear state-delayed system; Markov jump process; dissipative system; \mathcal{L}_2 -gain; bounded-real lemma; stochastic stability.*

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