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Robust Adaptive Control for a Class of Nonlinear Stochastic Time-delay Systems

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Abstract: The adaptive control problem of a class of stochastic time-delay systems is investigated. Firstly we consider a simple class of stochastic systems with time-varying delays and design the corresponding adaptive controller based on the solution of linear matrix inequalities (LMIs), which can render the closed-loop asymptotically stable in probability. Then we apply the adaptive idea to the interconnected system case. Under the condition that interconnections satisfy the matching condition, we propose a class of decentralized feedback controllers and the corresponding closed-loop systems are also asymptotically stable in probability. Numerical examples on controlling the two classes of stochastic systems are given to show the validity of obtained theoretical results.

Keywords: *Stochastic systems; time-delay systems; interconnected systems; adaptive control.*

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