Stochastic Mixed $\mathcal{H}_2/\mathcal{H}_\infty$ Control of Time-Varying Delay Systems

E.K. Boukas

Mechanical Engineering Department, École Polytechnique de Montréal, P.O. Box 6079, station "Centre-ville", Montréal, Québec, Canada H3C 3A7

Received: October 18, 2002; Revised: July 7, 2003

Abstract: This paper deals with the class of continuous-time linear systems with Markovian jumps and time-delay. The delay in the system dynamics is assumed to be time-varying. Under norm-bounded uncertainties and based on the Lyapunov method, a mixed $\mathcal{H}_2/\mathcal{H}_\infty$ controller that minimizes the $\mathcal{H}_2$ performance measure when satisfying a prescribed $\mathcal{H}_\infty$ norm bound on the closed-loop system is proposed. LMI-based sufficient conditions for the existence of the mixed $\mathcal{H}_2/\mathcal{H}_\infty$ controller and the upper bound of the performance measure are developed.

Keywords: *Jump linear system; linear matrix inequality; stochastic stability; stochastic stabilizability; norm bounded uncertainty; state feedback.*

Mathematics Subject Classification (2000): 93B36, 93C05, 93E03; 93E15.