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Sliding Mode Controller Design with Norm and Variance Constraints for Bilinear Stochastic Systems

Chang, Koan-Yuh; Lin, Huan-Jung; Cheng, Tsung-Lin

Abstract

Based on the concept of sliding mode control, this paper investigates the upper bound covariance assignment with H_∞ norm and variance constrained problem for bilinear stochastic systems. We find that the invariance property of sliding mode control ensures nullity of the matched bilinear term in the system on the sliding mode. Moreover, using the upper bound covariance control approach and combining the sliding phase and hitting phase of the system design, we will derive the control feedback gain matrix G , which is essential to the controller $u(t)$ design, to achieve the performance requirements. Finally, a numerical example is given to illustrate the control effect of the proposed method.

Key words : Bilinear stochastic systems; H_∞ norm constraint; Sliding mode control; Upper bound covariance control