Decentralized Observers for Optimal Stabilization of Large Class of Nonlinear Interconnected Systems

Abstract

This paper focuses on the design of decentralized state observers based on optimal guaranteed cost control for a class of systems which are composed of linear subsystems coupled by nonlinear time-varying interconnections. One of the main contributions lies in the use of the differential mean value theorem (DMVT) to simplify the design of estimation and control matrices gains. This has the advantage of introducing a general condition on the nonlinear time-varying interconnections functions. To ensure asymptotic stability, sufficient conditions expressed in terms of linear matrix inequalities (LMIs) are established to compute the control and the observation gains of the overall system. High performances are shown through numerical simulation of a power system with three interconnected machines.

References

1. M. Benallouch, M. Boutayeb, and M. Zasadzinski. Observers design for one-sided
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Index Terms

Computer Science
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Keywords

Large Scale System, Interconnected System, Decentralized Observer, Feedback Control