

CHAPTER 6

Conclusion

In this thesis, we have investigated the H_∞ control of certain dynamical systems with time-varying delay. Firstly, we have shown that the H_∞ control problem for linear time-varying system with time-varying delay has a solution if a certain Riccati differential equation has a solution. The feedback stabilising controller is designed via the solution of this Riccati differential equation. We also showed that, in case of there has no time delay in the system, the H_∞ control problem can be verified by the global null controllability of a linear control system. Secondly we have investigated the H_∞ control problem for a class of linear system with interval time-varying delay. The interval time-varying delay function does not necessary to be differentiable which allows time-delay function to be a fast time-varying function. A new Lyapunov-Krasovskii functional is constructed to obtain new delay-dependent sufficient conditions for the robust H_∞ stabilizability condition in term of LMIs. Finally, we have investigated the H_∞ control problem for a class of nonlinear systems with interval time-varying delay. A new Lyapunov-Krasovskii function was constructed and obtained new delay-dependent sufficient condition for the H_∞ control and asymptotic stability condition in term of LMIs. Numerical examples are given to illustrate the effectiveness of the theoretical results.

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