ABSTRACT

The research reported in this thesis deals the problem of robust control for uncertain dynamical systems for both continuous and discrete-time systems with time-varying delays. In particular, set of sufficient conditions are derived for obtaining the stabilization of the considered dynamical systems. The problem of robust reliable H_∞ control for active vehicle suspension system in the presence of linear fractional uncertainties with input time varying delay has been investigated. Also, the problem of sampled-data H_∞ control for uncertain mechanical systems with linear fractional uncertainties has been analyzed. Further, we studied the reliable H_∞ control for uncertain structural systems with time varying delays. Next, we dealt the problem of robust stabilization of switched uncertain singular systems with time varying delays. Moreover, the problem of sample-data and reliable H_∞ control design for uncertain TS fuzzy system with random delays are presented. Finally, the robust stabilization of discrete-time switched neural networks and reliable H_∞ control for stochastic neural networks with mixed delays are studied. By applying the Lyapunov stability theory, linear matrix inequality (LMI) technique and various analysis techniques like delay fractioning technique, free weighting matrix approach and Jensons inequality the above mentioned results are derived. The results are

established in terms of LMIs which can be easily solved by MATLAB-LMI toolbox. Numerical examples with simulation result are provided in each chapter to demonstrate the efficiency and applicability of the obtained results.