

OBSERVER-BASED CONTROLLER DESIGN OF TIME-DELAY SYSTEMS WITH INTERVAL TIME-VARYING DELAY

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TÓM TẮT:

This paper considers the problem of designing an observer-based output feedback controller to exponentially stabilize a class of linear systems with interval time-varying delay in the state vector. The time-varying delay is assumed to vary within an interval with known lower and upper bounds. The time-varying delay is not required to be differentiable nor its lower bound be zero. By constructing a set of Lyapunov-Krasovskii functionals and utilizing the Newton-Leibniz formula, a delay-dependent stabilizability condition which is expressed in terms of Linear Matrix Inequalities (LMIs) is derived to ensure the closed-loop system is exponentially stable with a prescribed convergence rate. The design of an observer-based output feedback controller can be carried out in a systematic and computationally efficient manner via the use of an LMI-based algorithm. A numerical example is given to illustrate the design procedure.