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Robust control design for delayed periodic piecewise time-varying systems with actuator faults. (English) [Zbl 07459437]
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Summary: This paper is mainly focused on the stabilization problem of uncertain delayed periodic piecewise time-varying systems inclusive of disturbances and faults in actuators. More specifically, the considered system is encompassed of periodic dynamics, which exhibits the nature of switched systems with fixed switching sequence and dwell time. The control protocol is configured in the form of both the present and past state information of the addressed system with passive performance. Moreover, the proposed control approach discloses the stabilization issue mainly by resolving the effect of faults in actuator components. Precisely, the desired periodic gain matrices of the developed controller are calculated by way of solving some matrix inequalities which are derived by making use of Lyapunov stability theory and matrix polynomial approach. As a result, the asymptotic stability of the considered system is ensured in conjunction with satisfied disturbance attenuation index. Conclusively, the simulation results of two numerical examples including mass-spring damping system are presented for validating the theoretical result.

MSC:
93B35 Sensitivity (robustness)
93D20 Asymptotic stability in control theory
93C43 Delay control/observation systems

Keywords:
delayed periodic piecewise time-varying systems; stabilization; robust control; asymptotic stability

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