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Improved results on fuzzy H^∞ filter design for T-S fuzzy systems. (English) Zbl 1205.93040
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Summary: The fuzzy H^∞ filter design problem for T-S fuzzy systems with interval time-varying delay is investigated. The delay is considered as the time-varying delay being either differentiable uniformly bounded with delay derivative in bounded interval or fast varying (with no restrictions on the delay derivative). A novel Lyapunov-Krasovskii functional is employed and a tighter upper bound of its derivative is obtained. The resulting criterion thus has advantages over the existing ones since we estimate the upper bound of the derivative of Lyapunov-Krasovskii functional without ignoring some useful terms. A fuzzy H^∞ filter is designed to ensure that the filter error system is asymptotically stable and has a prescribed H^∞ performance level. An improved delay-derivative-dependent condition for the existence of such a filter is derived in the form of linear matrix inequalities (LMIs). Finally, numerical examples are given to show the effectiveness of the proposed method.

MSC:

93B36 H^∞ -control
93E11 Filtering in stochastic control theory
93C42 Fuzzy control/observation systems

Cited in 4 Documents

Keywords:

H^∞ filter design; T-S fuzzy systems; Lyapunov-Krasovskii functional; asymptotically stable

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