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不确定非线性系统的模糊鲁棒??$_\infty$ 跟踪控制

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Fuzzy robust ??$_\infty$ tracking control for uncertain nonlinear systems

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摘要

针对一类不确定非线性系统, 提出一种新的模糊鲁棒??∞ 跟踪控制方案. 应用模糊T-S 模型表征非线性系统, 系统不确定性通过模糊逻辑系统消除. 由线性矩阵不等式和自适应律给出了模糊控制器存在的一个充分条件. 基于Lyapunov 稳定性理论, 模糊控制方案在所有闭环信号最终一致有界下保证了期望的??∞ 跟踪性能. 两连杆机械臂的仿真结果表明了该方案的可行性.

关键词 : 模糊T-S 模型, 模糊逻辑系统, 非线性系统, 不确定性, 跟踪控制

Abstract :

A novel fuzzy robust ??∞ tracking control scheme for a class of uncertain nonlinear systems is addressed. The nonlinear system is represented by the fuzzy Takagi-Sugeno(T-S) model, and fuzzy logic systems are used to compensate the uncertainties. A sufficient condition for the existence of the fuzzy controller is given in terms of linear matrix inequalities(LMIs) and the adaptive law. Based on the Lyapunov stability theorem, the fuzzy control scheme guarantees the desired ??∞ tracking performance in sense that all the closed-loop signals are uniformly ultimately bounded(UUB). Simulation results of 2-link manipulator show the effectiveness of the developed control scheme.

Key words : fuzzy T-S model fuzzy logic systems nonlinear systems uncertainties tracking control.

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