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区间时滞控制系统鲁棒绝对稳定性的LMI方法

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摘 要: 针对区间Lurie时滞控制系统, 基于区间矩阵的等价描述和S-过程, 构造了关于Lurie型Lyapunov泛函中正定矩阵和积分项系数的线性矩阵不等式(LMI), 通过LMI的解构造的Lyapunov泛函来保证系统的鲁棒绝对稳定性, 不必选择和调整参数; 讨论了非线性机构分别具有无穷扇形角、有限扇形角约束的情形, 所获结果适用于系统具有多个非线性执行机构的情形; 通过实例分析了扇形角的大小与鲁棒稳定度的关系, 研究结果表明该方法是有用的。

关键字: 区间Lurie时滞控制系统; 鲁棒性; 线性矩阵不等式

LMI approach for robust absolute stability of interval Lurie control systems with time-delay

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Abstract: Based on the equivalent description of interval matrices and S-procedure, an LMI is given for the free parameters such as the positive definite matrix and the coefficients of the integral terms of the Lurie-type Lyapunov function for interval Lurie control systems with time-delay. The Lyapunov functional constructed by the solution of the LMI is adopted to guarantee the robust stability of the systems, and the parameters needn't to be readjusted. Not only the case of the finite sector but also the infinite sector are discussed, and the conclusion is applicable to the case of multiple non-linearities. Finally, an example is provided to demonstrate the effectiveness of the proposed method, and the relation between the size of the sector and the robustness is analyzed through the example.

Key words: interval Lurie control systems with time-delay; robustness; linear matrix inequality

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