

多平衡点二维线性时不变切换系统的稳定性及镇定性

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Stability and stabilization of two-dimensional linear time-invariant switched systems with multi-equilibria

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摘要

图/表

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摘要

研究含不稳定子系统的多平衡点二维线性时不变切换系统的稳定性和镇定性问题. 首先, 在每一子系统仅有唯一焦点或中心、不同子系统的平衡点互异的情形下, 确定含所有子系统平衡点的唯一特定区域, 据此给出系统区域稳定的概念; 然后, 基于区域稳定的定义, 利用解析法得到系统全局区域渐近稳定的简单判据, 并设计了全局区域渐近镇定控制器及其算法. 最后, 通过数值仿真算例表明了所得结果的有效性和易操作性.

关键词: 切换系统, 区域稳定, 区域镇定, 多平衡点, 算法

Abstract:

Stability and stabilization issues of two-dimensional linear time-invariant switched systems with unstable subsystems and multi-equilibria are investigated. Firstly, for the case that each subsystem has a unique focus or center and these equilibria are different from each other, a unique determined region containing all equilibria is defined, and a concept of region stability is given. Then, based on the region stability introduced, several simple criteria of global region asymptotical stability are proposed for such switched systems via the mathematical analysis method. Global asymptotical region stabilizing controls and corresponding algorithms are also designed for the systems. Finally, an illustrative example and its simulations demonstrate the effectiveness and practicality of the obtained stability and stabilization results.

Key words: switched systems region stability region stabilization multiple-equilibria algorithm

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