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## 随机非线性扰动下广义马氏跳变系统的控制器设计

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## Generalized stabilization of singular Markovian jump systems with stochastic nonlinear perturbation

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摘要

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## 摘要

针对实际系统中非线性扰动以一定概率存在的情况, 讨论广义马氏跳变系统的控制问题. 首先, 运用Bernoulli 变量描述系统中非线性扰动的存在与否, 建立相应的数学模型, 得到在上述一般条件下系统的随机容许性与解的存在唯一性条件. 然后, 以LMI 形式给出模式依赖和模式独立控制器的存在条件. 与现有结果相比, 所得结果考虑了非线性扰动的存在概率, 具有较小的保守性. 最后, 通过数值例子验证了所得结果的有效性和优越性.

**关键词** : 广义马氏跳变系统, 非线性扰动, 线性矩阵不等式

## Abstract :

The generalized stabilization problem of singular Markovian jump systems(SMJSS) with stochastic nonlinear perturbation is discussed, where the existence of nonlinear perturbation belongs to some probability. By exploiting the Bernoulli variable to describe whether the nonlinear perturbation exists or not, a kind of model for such systems is firstly established. Based on the obtained criteria, new sufficient conditions for the existence of both mode-dependent and mode-independent controllers are given as strict linear matrix inequalities(LMIs). Different from the existing results, several general conditions on stochastic admissibility depending on such a probability are developed, where the uniqueness and sufficiency of solution is also guaranteed. Because of such a probability considered, the corresponding results are less conservative. Finally, numerical examples illustrate the utility and superiority of the presented results.

**Key words** : singular Markovian jump systems nonlinear perturbation linear matrix inequality

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