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反馈线性化系统的非线性预测滑模控制

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NONLINEAR SLIDING MODE PREDICTIVE CONTROL FOR THE FEEDBACK LINEARIZABLE SYSTEM

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摘要

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摘要 对反馈线性化系统进行非线性预测滑模控制的设计, 利用预测滑模的二次型代数指标的最小化来设计滑模控制律, 按系统的输出相对度来设计滑动模, 二次型指标中包含了控制量的代价函数项, 这项是连续可调的, 可以避免系统控制输入的饱和现象。证明了非线性预测滑模控制系统具有的鲁棒性, 并导出了鲁棒滑模预测控制器。

关键词: 预测控制 滑模控制 鲁棒性

Abstract: Nonlinear sliding mode predictive control is designed for the feedback linearizable system. Based on the minimum of the quadratic index of a predictive sliding mode, which contains the tracking error, its higher order derivation, and the integral of the tracking error, the sliding mode control rule is derived. According to the relative degrees of outputs, the sliding modes are designed. Index contains the cost function of control, which can be adjusted and may prevent the control effect from saturation. The robustness of this kind of control system is proposed. A robust control rule is proposed. The effective of this approach is demonstrated by the simulation for a two order system. The results are acceptable.

Keywords: predictive control sliding mode robustness

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