论文与报告

非线性系统的鲁棒自适应模糊控制

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摘要
针对反馈线性化后的不确定非线性对象,提出了一种鲁棒自适应控制方法.采用模糊模型逼近不确定项,用逐步后推技术构造出自适应律,在线调节模糊模型的参数,同时处理存在估计误差时的干扰抑制问题.该方法还用于感应电动机速度控制的仿真.用李亚普诺夫方法证明了整个系统的稳定性和鲁棒性.该方法适用于任意有界时变干扰,通过模糊模型还可以加入对干扰的经验知识.
关键词 非线性控制 鲁棒自适应控制 自适应模糊模型 Lyapunov方法 感应电动机
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Robust Adaptive Fuzzy Control of Nonlinear Systems

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Abstract
Based on the feedback linearized model, a robust adaptive control method is presented. Fuzzy model is employed to approximate uncertainties. The adaptive law of parameters in fuzzy model is constructed, and the influence of inherent approximation error is attenuated as well. The proposed method is applied to the simulation of speed control of induction motor. The stability and robustness of the entire system is proved by Lyapunov method. The proposed method is applied to arbitrary time-varying and bounded disturbances. Human knowledge of disturbances can be used by fuzzy model.
Key words Nonlinear control robust adaptive control adaptive fuzzy model Lyapunov method induction motor
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