

[2009-0059] 星姿态直接自适应模糊预测控制

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摘要

对具有模型不确定性和未知外干扰的卫星姿态系统提出了多输入多输出直接自适应模糊预测跟踪控制设计方法. 此方法先基于卫星姿态动力学模型设计出非线性广义预测控制律, 再构造直接自适应模糊控制器逼近预测控制律中因模型不确定性引起的未知项. 文中证明了所设计的控制律能使卫星跟踪给定的期望姿态轨迹, 跟踪误差收敛到原点的小邻域内. 仿真结果验证了此方法的有效性.

关键词 [卫星姿态控制](#) [非线性广义预测控制](#) [自适应模糊控制](#)

分类号

[2009-0059] Direct Adaptive Fuzzy Predictive Control of Satellite Attitude

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Abstract

A multi-input multi-output direct adaptive fuzzy predictive tracking control method for a satellite attitude systems with parametric uncertainty and external disturbance is presented. First, a nonlinear generalized predictive controller is designed based on the satellite attitude model; then, a direct adaptive fuzzy controller is constructed to approximate the unknown terms in the predictive control law caused by system model uncertainties. It is proved that the proposed controller can make satellite track the desired attitude trajectory and force the tracking error to converge to a small neighborhood of the origin. Simulation results show the effectiveness of the method.

Key words [Satellite attitude control](#) [nonlinear generalized predictive control](#) [adaptive fuzzy control](#)

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