一类时滞非线性系统的自适应模糊控制

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摘要   对于一类SISO输入时滞已知,
状态时滞不确定但有上界的能采用后推设计方法的非线性系统提出一种基于后推设计、
自适应模糊控制和滑模控制的控制方案.通过状态变换,把输入时滞系统转化为无输入时滞的系统.
用模糊系统来估计系统的未知连续函数,对转化后的新系统设计自适应滑模控制器,使得新系统的状态有界,
通过递推证得原系统的状态半全局一致有界.

关键词   输入时滞, 后推设计,模糊控制, 自适应控制, 滑模控制.

分类号   93C42

Adaptive Fuzzy Control for a Class of Delayed Nonlinear Systems

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Abstract A control scheme combined with backstepping, fuzzy logic, adaptive control and sliding model control is proposed for the stabilization of a class of backstepping structure SISO nonlinear systems with known input delay and unknown bounded state delay. By using state transformation, the original system is converted to the system without input delay. The fuzzy logic system is employed to estimate the unknown continuous function. The state of the converted system is bounded by adaptive sliding mode controller. Finally, the original system is proved to be semi-globally uniformly ultimately bounded.

Key words   Input delay   backstepping   fuzzy control   adaptive control   sliding mode control.

DOI:

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