短文

离散非线性时变系统开闭环PI型迭代学习控制律及其收敛性

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摘要
对于具有重复运动性质的对象,迭代学习控制是一种有效的控制方法.针对一类离散非线性时变系统在有限时域上的精确轨迹跟踪问题,提出了一种开闭环PI型迭代学习控制律.这种迭代律同时利用系统当前的跟踪误差和前次迭代控制的跟踪误差修正控制作用.给出了所提出的学习控制律收敛的充分必要条件,并采用归纳法进行了证明.最后用仿真结果对收敛条件进行了验证.
关键词　迭代学习控制　非线性时变系统　收敛性
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An Open-Closed-Loop Pi-Type Iterative Learning Control Scheme for Discrete Nonlinear Time-Varying Systems and its Convergence

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Abstract
Iterative learning control is an effective approach to the control of processes that are repetitive in nature. In this paper, an open-closed-loop PI-type iterative learning control scheme for the precise tracking control of a class of discrete nonlinear time-varying systems over a finite time interval is presented. The scheme updates control input with tracking errors of both current and last iterations simultaneously. Sufficient and necessary conditions which guarantee the convergence of the scheme are given and then proved with inductive method. Finally the conditions are verified with simulation results.

Key words　Iterative learning control　nonlinear time-varying system　convergence

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