

柔性机械手机械结构与自适应控制全局优化设计

屠立 周丕宣 张树有

浙江大学

关键词: 柔性机械手 结构设计 自适应控制 线性二次调节器 全局优化

摘要: 针对柔性机械手研究中未将控制器和机械结构之间的耦合同时加以考虑的问题, 在整体优化目标下, 通过使用适用于各种几何约束的自适应迭代算法来获取机械臂状态和控制器参数, 以结构优化为外循环, 以LQR控制律优化为内循环, 设计了全局优化设计方法, 将柔性机械手机械结构的设计与控制算法的设计有机结合在一起。并以单关节柔性臂的设计为例进行了仿真, 仿真结果表明, 将控制律与结构优化综合考虑的方法有效、可行。 Under the integration optimization object, the beam shape and controller parameters were obtained by using an adaptive iterative algorithm with the accommodation of various geometrical constraints to consider the coupling between the controller and the mechanical structure of a flexible manipulator concurrently. The global optimization method was designed to combine the physical construction design with control algorithm by using the structure optimization as the outer-loop and the linear quadratic regulator(LQR) control as inner-loop. The simulation work of a single link flexible beam was done. The simulation results showed that the integration method to consider the control law and the structure optimization synthetically is effective and feasible.

[查看全文 \(请使用Adobe Acrobat 6.0版本浏览\)](#) [返回首页](#)

[引用本文](#)