

遥操作工程机器人改进力反馈控制方法

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摘要

针对力觉临场感遥操作工程机器人双向液压伺服控制系统, 在采用p f型控制结构时, 容易产生反馈力冲击问题, 提出了基于T S型模糊推理逻辑构造一个非线性模糊变增益力反馈系数, 构成改进的力反馈控制方法。设计了RBF PID型参数可调控制器, 形成双向液压伺服控制系统, 通过实验验证了改进方法的有效性。实验结果表明, 改进的力反馈控制方法既能保证从手对主手的位置跟随精度, 又能使主手连续的跟随从手受力情况, 减小了反馈力冲击现象, 增加了力反馈的平顺性。提高了力反馈遥操作工程机器人系统的操作性能和透明度。

关键词 [流体传动与控制](#); [模糊变增益反馈系数](#) [力反馈](#) [遥操作工程机器人](#)

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Improved force feedback control method for construction telerobot

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Abstract In the bilateral hydraulic servo control system of a construction telerobot with in situ force sensing, the p f type force feedback architecture is liable to result in an impact on the operator hand, and its high amplitude will cause the control unstable. So, based on the T S type fuzzy reasoning logic, an improved force feedback control strategy with the feedback scaling which could be modified online nonlinearly and continuously was proposed. A RBF PID force controller with adjustable parameters was designed and a new bilateral hydraulic servo control system was developed. Its experimental results showed that the proposed force feedback control strategy improves the tracking precision of the slave hand to the master hand, makes the master hand follow well the force acting on the slave hand, reduces the impact of the feedback force, enhances the compliance and transparency of the teleoperation of the construction telerobot system.

Key words [turn and control of fluid](#) [fuzzy feedback scaling](#); [force feedback](#); [construction telerobot](#)

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