

遥操作机器人执行末端的力反射型变增益力反馈算法

侯敬巍,赵丁选,尚涛,唐新星

吉林大学 机械科学与工程学院, 长春 130022

收稿日期 2007-7-24 修回日期 2007-9-24 网络版发布日期 2008-4-22 接受日期 2007-9-24

摘要

在以遥操作工程机器人执行末端为从端的力反馈双向伺服系统中,为了使主端受力真实地反映从端执行末端叉手所受的环境力,在力反射型算法的基础上,提出了一种变增益力反馈算法。根据机器人叉手的运动模型建立叉手液压缸位移与驱动力关系的数学模型,以此调节主端的力反馈控制增益。为了验证该算法的优越性,将该算法与常用的力反射型算法进行了比较实验。实验证明,该算法在保证系统稳定性的前提下,精确地反映了机器人叉手在运动中的惯性力和阻尼力所带来的影响,操作者可以更为真实地感知机器人从手所受环境力的变化,有利于系统工作性能的提高。

关键词 [流体传动与控制](#) [力反馈](#) [主从控制](#) [变增益算法](#) [系统辨识](#)

分类号 [TH137](#) [TP242](#)

Gain switching force feedback algorithm for teleoperation robot end actuator

Hou Jing-wei,Zhao Ding-xuan,Shang Tao,Tang Xin-xing

College of Mechanical Science and Engineering, Jilin University,Changchun 130022,China

Abstract A novel gain switching force feedback algorithm was proposed based on the common force reflect algorithm to make the master end force truly reflect the force acting on the end actuator forkglove of the slave robot in the bidirectional force feedback servo system of the master slave system of the teleoperation engineering robot. A mathematical model for the relationship between the displacement and the driving force of the robot forkglove cylinder was built based on the kinematics of the forkglove to adjust the force feedback control gain of the master end. The proposed gain switching algorithm was compared experiment ally with the common force refleet algorithm. It was proved that the novel algorithm accurately reflects the effects of the inertia force and the damp force of the robot forkglove during its motion process under the prerequisite for system stability, the operator can sense more truly the variation of the force acting on the stave end of the robot, which helps to improve the working capability of the teleoperation system.

Key words [turn and control of fluid](#) [force feedback](#) [master slave control](#) [gain switching](#) [system identification](#)

DOI:

通讯作者 赵丁选 zdx@jlu.edu.cn

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(492KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [复制索引](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“流体传动与控制”的相关文章](#)

▶ 本文作者相关文章

- [侯敬巍](#)
- [赵丁选](#)
- [尚涛](#)
- [唐新星](#)