

具有临场感的主从机器人系统双边控制策略

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**摘要** 针对主从机器人系统双边控制策略的透明性问题, 利用电液比例阀控制液压缸建立了单自由度主、从机器人临场感实验系统。在力和运动的双边控制中, 采用力反馈伺服型、并行型和改进并行型3种控制策略, 对空载、

小刚度弹性负载和大刚度弹性负载情况下的位置和力跟踪性能分别进行了实验。实验结果表明: 力反馈伺服型、并行型的运动跟踪存在时间滞后, 主手受力存在振动; 与其他两种控制策略相比, 改进并行型控制策略在小刚度和大刚度负载时具有较好的透明性。

**关键词** [流体传动与控制](#) [力觉临场感](#) [双边控制策略](#) [遥控机器人](#) [电液比例控制](#) [透明性](#)

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Bilateral control scheme of master slave telerobotic system with telepresence

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**Abstract** To realize the transparency of bilateral control scheme of the master slave telerobotic system, a test system of one degree of freedom master slave telerobotic system with telepresence was built up by applying two electro hydraulic proportional valves to control the hydraulic cylinder. Three control schemes, i.e. force feedback servo type, parallel type and improved parallel type were suggested in the bilateral control of force and motion. The experiments on the position tracking and the position tracking behaviors were conducted under conditions of no load, elastic load with small stiffness as well as hard load with large stiffness respectively. Results show that there are time delay of the motion tracking as well as force vibration in the main hand for the force feedback and parallel control schemes and the improved parallel control scheme, comparing with the others, is characterized by good transparency under both the elastic and hard load conditions.

**Key words** [turn and control of fluid](#) [force telepresence](#) [bilateral control strategy](#) [telerobot](#) [electro hydraulic proportional control](#) [transparency](#)

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