

TELEOPERATION OF A MANIPULATOR WITH A MASTER ROBOT OF DIFFERENT KINEMATICS: USING BILATERAL CONTROL BY STATE CONVERGENCE

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This paper presents the teleoperation method of manipulators which have different kinematics with respect of the master robots using bilateral control by state convergence. This method makes a relation between the kinematics of the master and slave robot using a virtual robot. This method allows controlling manipulators which are a part of different kinds of robot as: climber robots, underwater robots, human robots, etc.

Keywords: Haptic; Telerobotic; robot control; robotic manipulators.

1. Introduction

In a telerobotic system the human operator perceives information from the remote environment through the human system interface which reflects the interaction forces and acts accordingly by sending commands or references to the remote devices (slave robot).¹ These characteristics improve and facilitate the development of the complex tasks.⁴

Now, the algorithms of bilateral control by state convergence allow controlling separately each equivalent couple of joints of the master and slave robots.³ The new method allows controlling slave and master robot with different kinematics. It relates the end effectors of the robots and not each their joints. This characteristic allows controlling different kinds of complex robots with manipulators like the robots show in the figure 1 with a master of six degrees of freedom (DOF). In this paper is presented an application

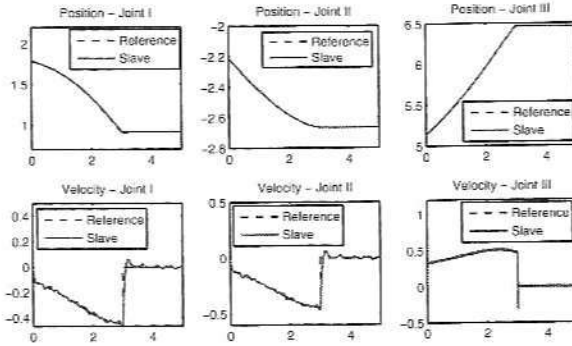


Figure 6. Position-velocity references and Position-velocity slave joints

6. Conclusions

This paper presents a design of a bilateral control by convergence state where the master and slave robot have different kinematics. This method will allow the design of controllers for complex robots like hybrid robots (parallel-serial) using a simple commercial haptic device. With this method it is not necessary to use force sensors over the master robot and the slave robot only needs one to feedback the human operator.

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