Bilateral Control of a 2-DOF Teleoperated Manipulator Using UDP Scheme

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Original Article

Keywords: teleoperation, bilateral, position tracking, model identification, Least-Squares, FLC, PID, network time delay, UDP, MATLAB, SIMULINK

Posted Date: April 7th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-309336/v1>

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Abstract

In this paper, a workspace-control system was developed to deal with the problem of position-tracking of bilateral teleoperated two degrees of freedom manipulators, and aid the human operator in driving and controlling the slave robot that performs critical and difficult tasks such as under water works. The developed system consists of, "JUPITER XL SCARA" robot as a slave manipulator with only the first two links activated, a wireless User Datagram Protocol (UDP) network, and PC as a master controller. The system model parameters identified using the Least-Squares method. A PID and FLC controllers with different input signals were applied to the system. It was proved experimentally and by simulation on Matlab that the FLC gave a better performance than the PID controller. The two parallel loop subroutine technique proved a great enhancement to the system performance as it decreased the total delay time in the system to almost 25 milliseconds.

Full Text

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Figures

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JUPITER XL SCARA robot. (1. Optical encoder, 2. Link two, 3. Link three, 4. Gripper, 5. DC Motor, 6. link one)

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Figure 3

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Figure 4

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Figure 5

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Figure 6

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Figure 7 was not provided with this version of the manuscript.

Figure 7

Figure 7 was not provided with this version of the manuscript.

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