

Modeling and Control of a 4DoF Robotic Assistive Device for Hand Rehabilitation

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Abstract : For those who have lost the ability to move their hand, going through repetitious motions with the assistance of a therapist is the main method of recovery. We have been developed a robotic assistive device to rehabilitate the hand motions in place of the traditional therapy. The developed assistive device (RAD-HR) is comprised of four degrees of freedom enabling basic movements, hand function, and assists in supporting the hand during rehabilitation. We used a nonlinear computed torque control technique to control the RAD-HR. The accuracy of the controller was evaluated in simulations (MATLAB/Simulink environment). To see the robustness of the controller external disturbance as modelling uncertainty ($\pm 10\%$ of joint torques) were added in each joints.

Keywords : biorobotics, rehabilitation, robotic assistive device, exoskeleton, nonlinear control

Conference Title : ICCDSR 2016 : International Conference on Control, Dynamic Systems, and Robotics

Conference Location : Amsterdam, Netherlands

Conference Dates : August 04-05, 2016