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Independent joint control of a 3-DOF robotic system using PI controller

(Conference Paper)

Sado, F. [✉](#), Sidek, S.N. [✉](#), Yusuf, H.M. [✉](#)

Department of Mechatronics Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, Malaysia

Abstract

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The use of robotic devices for repetitive exercising of patients with upper limb sensor motor impairment has become accepted as effective in rehabilitation therapy. Two forms of rehabilitation robotic devices for upper limb are so far available which include the exoskeleton and end-effector based devices with the emphasis on proper joint coordination and control to actualize effective trajectory tracking and consequently effective therapy. An end-effector based 3 degree of freedom (3-DOF) rehabilitation platform is proposed in this work which uses brushless DC (BLDC) motor for actuation of the two revolute joints. For set-point and trajectory tracking of the revolute joints, each joint and corresponding link has been modeled as a SISO system and a PI compensator has been employed. Preliminary simulation studies showed the effectiveness of the proposed control framework. © 2014 IEEE.

Author keywords

compensator end-effector rehabilitation robotic sensorimotor

Indexed keywords

Engineering controlled terms: Brushless DC motors Degrees of freedom (mechanics) End effectors Joints (anatomy) Neuromuscular rehabilitation Patient rehabilitation Patient treatment

3 degree of freedom (3-DOF)

Brushless dc (BLDC) motors

compensator

Independent joint controls

Rehabilitation robotics

Rehabilitation therapy

sensorimotor

Trajectory tracking

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