Simultaneous Triple Joint Movement Fuzzy Control in FES-assisted Rowing Exercise

Mohammad Zarei [a], Mehran Jahed [a], Mohammad Mehravar [b]

[a] *Sharif University of Technology, Iran;* [b] *Jundishapur University of Medical Sciences, Iran*

Fuzzy Control of rowing exercise using Functional Electrical Stimulation (FES) concerns ankle, knee and hip joints. Muscular Modeling for each joint may contain two groups of muscles, namely extension and flexion. In the proposed method, joint controllers provide electrical stimulation pulses to the appropriate muscle group based on the trajectory error and according to a prescribed pattern designed for rowing exercise. Results indicate that the simulated Fuzzy control of desired angles closely match the experimental values for prescribed joints. Moreover, the robustness of the controller in presence of external disturbance is examined and the results show that the tracking of each joint angle is appropriate.