Abstract

Functional Electrical Stimulation (FES) is a device for restoring the functionality of paralyzed portion of human body due to spinal cord injury (SCI). Recent clinical studies demonstrated that the recovery of functionality of paralyzed portion was contributed by electrical stimulation of different nerves that generate missing functions of the upper limb due to SCI, which uses symmetric biphasic pulses that allow both pulses to depolarize the neural membrane, hence suppress skin breakdown and itching. However, the anodic current reversal of these pulses can abolish an action potential developing in response to the cathodic phase. To overcome this problem, this device uses fully programmable symmetric biphasic pulses with inter-pulse interval for surface electrodes and it works in both modes: open loop as well as closed loop. A microcontroller is used for control of stimulation parameters such as stimulation frequency, pulse width, inter-pulse duration and pulse amplitude. These parameters are set automatically with feedback electromyography (EMG) signals recorded by the sensors from patient in closed loop mode or manually with the help of push-buttons and LCD display in open loop mode.

References
Functional Electrical Stimulation using PIC Microcontroller

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Index Terms

Computer Science
Keywords

Fes  Electrical Stimulation  Sci  Skin Breakdown  Emg  Open Loop Mode  Closed Loop Mode.