World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:12, No:02, 2018

A Self-Adaptive Stimulus Artifacts Removal Approach for Electrical Stimulation Based Muscle Rehabilitation

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Abstract : This paper reports an efficient and rigorous self-adaptive stimulus artifacts removal approach for a mixed surface EMG (Electromyography) and stimulus signal during muscle stimulation. The recording of EMG and the stimulation of muscles were performing simultaneously. It is difficult to generate muscle fatigue feature from the mixed signal, which can be further used in closed loop system. A self-adaptive method is proposed in this paper, the stimulation frequency was calculated and verified firstly. Then, a mask was created based on this stimulation frequency to remove the undesired stimulus. 20 EMG signal recordings were analyzed, and the ANOVA (analysis of variance) approach illustrated that the decreasing trend of median power frequencies was successfully generated from the 'cleaned' EMG signal.

Keywords : EMG, FES, stimulus artefacts, self-adaptive
Conference Title : ICBBE 2018 : International Conference on Biomechanics and Biomedical Engineering
Conference Location : Kuala Lumpur, Malaysia
Conference Dates : February 12-13, 2018