

Novel Design of Electrotherapeutic System

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Abstract

This paper presents a new design of electrotherapeutic system characterized by a robust graphical user interface (GUI) design and patient's feedback approach in order to guide electrical stimulation process. The system is based on stimulating the patient by an electric current and analyzing the signals generated from the patient's body in response to the stimulation effect. These signals will be considered as the feedback mechanism to automatically adjust the stimulating parameters to reach the optimum stimulation effect and prevent any harm, pain or fatigue due to stimulation process. Various electrical waveforms with digitally tunable stimulation parameters can be generated from this system and voltage-controlled constant current stimuli are provided by the stimulation output circuit. The stimulating parameters (pulse type, frequency, amplitude and duration) can be adjusted from the GUI either *manually* by tuning the parameters in the interface or *automatically* by making use of patient's feedback parameters including Electrocardiogram and Electromyogram; to interpret the optimum waveforms and to elicit the desired functions automatically. The experimental testing of this system shows that it works properly and efficiently. In conclusion, the approach described herein might offer a way towards the alterations of the common electrical muscle stimulators.