

Evaluation of Gaussianity of the Surface Electromyography Signal as Per the Angle of Inclination of the Muscle Fibers.

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Abstract

The study of Electromyography (EMG) signals can be useful for clinical/biomedical applications, prosthesis/rehabilitation devices, and modern human computer interaction, among others. They are acquired from activity of muscles after an electrical stimulation by use of electrodes for detection purposes. The purpose of this study was to evaluate the effect of inclination of muscle fibers on the degree of gaussianity of EMG signal using the parameter of Kurtosis and the estimate the effects of motor unit recruitment thresholds and the level of voluntary muscle contraction on the degree of gaussianity of the surface EMG signal. Results showed that gaussianity of EMG signal is different as the angle of inclination is varied from 0° to 180° and that the surface EMG signal is more Gaussian for a lower recruitment threshold of 30%, which is less Gaussian for a higher recruitment threshold of 70%. With a high level of voluntary muscle contraction, the degree of gaussianity is high compared to the lower level. This paper provides better understanding of the behavior of surface EMG signals that will be useful for researchers seeking to improve performances in the clinical/biomedical applications, prosthesis/rehabilitate sense and human computer interactions.

Keywords: Electromyography, Gaussianity, Muscles, Kurtosis.