

THE HIGHER-ORDER STATISTICS APPLIED TO EMG SIGNALS OF PERSONS WITH LOW BACK PAIN

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Low back pain (LBP) is pain in the area on the posterior aspect of the body that lasts for at least one day. LBP affects approximately 7.5% of the world's population. In Ukraine years lived with disability caused by LBP are 1.5 times more than in the world and its annual change is 0.43 % that's 8 times greater than global annual change of this measure [1]. LBP is generally considered difficult to treat and WHO welcomes new findings for the treatment of LBP via non-invasive methods. Also it's difficult for diagnostics, as about 90 % of people suffering from LBP do not have a pathoanatomical source of pain.

Electromyography (EMG) method is used for diagnostics of LBP. EMG signals are usually analyzed using 2nd-order statistical methods, such as power spectrum [2], [3], but due to the non-stationarity, nonlinearity and non-Gaussianity of electromyograms, these methods cannot provide an adequate analysis. That's why higher-order statistics (HOS) methods were selected for this research [4], [5].

EMG signals were obtained during examination of the extensor longus of the trunk at the level of the lumbar spine. EMG signals from 5 groups of patients were processed.

It was found that the HOS method can be used to evaluate the electromyograms of patients with LBP, as it gives additional information to the power spectral density estimation. So, by this method we would improve the information content of EMG examination of patients with LBP.

References:

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