应用

基于独立分量分析和小波变换的膈肌肌电信号降噪

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摘要：

提出了一种基于独立分量分析(ICA)和小波变换的处理方法,用于去除膈肌肌电信号中的心电干扰。首先利用独立成份分析法从膈肌肌电信号分解出心电独立成份,并对该心电成份选择合适的高通滤波器加以滤除,其它为膈肌肌电信号的独立分量进行五尺度小波分解以去除含心电的近似分量,再对各层细节分量进行小波重构,然后将处理后的全部独立分量反射投影回原始信号空间,最后,对临床采集的5路膈肌肌电信号进行实验分析,并与传统ICA方法进行对比,结果表明本文方法有更好的降低心电干扰性能。

关键词： 信号处理；独立分量分析；小波变换；膈肌肌电信号；心电干扰信号

Research of De-noising Method for EMGdi Signal Based on Independent Component Analysis and Wavelet Transformation

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Abstract:

A de-noising method based on independent component analysis and wavelet transformation is proposed in this paper to remove ECG interference. Firstly, the independent components of ECG are gotten by employing ICA to EMGdi signals. Select a suitable high-pass filter to remove the ECG components, and the approximate weight of other EMGdi components are removed after wavelet decomposition at the fifth scale, on the other hand, the details are reconstructed. Finally, reflect these processed independent components back to the original signal space. Experiment on collected 5 channel clinical EMGdi signal is presented. Comparing the results with the traditional ICA method, it shows that the method proposed is better than the traditional ICA method in removing ECG interference.

Keywords: signal processing　independent component analysis　wavelet transformation　EMGdi signal　ECG interference signal

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