

## 典型应用

### 自适应小波尺度谱阈值在膈肌信号降噪的应用

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**摘要:** 膈肌肌电信号是人体微弱的生物电信号,此信号常受到心电信号的严重干扰。为了提高阈值在膈肌肌电信号降噪的准确度,提出了一种小波尺度谱阈值自适应的降噪算法。该算法先对膈肌肌电信号进行小波变换,再把小波系数转化为小波尺度谱,然后确定心电干扰位置,并且根据心电邻域小波能量自动调整阈值从而去除心电干扰。通过对膈肌肌电信号进行实验分析,并且与小波阈值方法进行对比,结果表明该方法降低了心电干扰并且保留了膈肌肌电信号的特征。

**关键词:** 小波尺度谱 阈值自适应 心电干扰 膈肌肌电信号

### Application of adaptive wavelet scalogram threshold in diaphragmatic electromyographic signal denoising

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**Abstract:** As weak bioelectricity signals, diaphragmatic electromyographic (EMGdi) signals are always corrupted by strong electrocardiography (ECG) signals. A denoising algorithm based on wavelet scalogram adaptive threshold was proposed in this paper to improve the precision of threshold in EMGdi signal denoising. This algorithm found the position of ECG interference by performing wavelet transform on the EMGdi signals and conveying wavelet coefficients to wavelet scalogram, and then automatically adjusted the threshold by ECG neighborhood wavelet energy in order to remove ECG interference. By comparing the results with the wavelet threshold, it shows that the proposed method can eliminate the ECG interference from EMGdi and reserve EMGdi signal characteristics effectively.

**Keywords:** wavelet scalogram adaptive threshold electrocardiography (ECG) interference diaphragmatic electromyographic (EMGdi) signal

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