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# 用独立分量分析和小波变换方法研究实验过程中脑诱发电位信号强度的变化

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本文利用独立分量分析和小波变换技术,通过空间信息的综合使用,有效提高了脑电信号的信噪比,并成功的提取到实验过程中诱发电位强度变化的情况,对由于实验时间增加导致的大脑疲劳对诱发信号的影响做出定量评价。结果表明,在10分钟左右的实验过程中,诱发电位的幅度会下降接近40%。本文的研究结果将有助于考察在诱发电位提取过程中诱发电位信号本身不确定性及变异性等问题,并在此基础上指导合理的实验方案设计。

## The Study of Evoked Potential's amplitude variation in experiment by ICA and WT

This paper promotes a method to track the variation of evoked potential's amplitude during the electroencephalograph recording by the application of independent component analysis and wavelet transform. With the aid of the spatial information and multi-trial recording, the signal-to-noise ratio is improved greatly enough to quantitatively evaluate how the evoked potential's amplitude varies across trials. The result on real auditory evoked potential shows a drop of about 40% on the amplitude of evoked potential during 10 minutes recording. The present work is helpful to study the uncertainty and singularity of evoked potential. Furthermore, it will put forward the reasonable experiment design of evoked potential extraction.

### 关键词

独立分量分析(Independent Component Analysis (ICA)); 小波变换(Wavelet Transform (WT)); 诱发电位(Evoked Potentials (EP))