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一种MEMS胎儿心率测量仪的设计与仿真

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摘　要：

针对传统胎儿心率测量仪价格昂贵、对胎儿具有一定副作用等缺点，运用MEMS 加速度传感器，设计了一个高安全性的便携式胎儿心率测量仪。本文设计了加速度信号低通滤波放大电路并在ORCAD上进行了仿真，仿真结果表明该低通滤波电路能够较好的得到低频率胎心率信号。对于胎儿心率信号采用自相关函数法和频谱分析相结合的信号处理算法，MATLAB仿真结果表明此算法能有效的去除噪声。

关键词：MEMS加速度传感器；胎儿心率；自相关法；频谱分析

Design and Simulation of a MEMS-Based FHR Measuring Apparatus

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Abstract:

Traditional apparatus for Fetal Heart Rate (FHR) measurement is expensive, and also it’s harmful to the fetus. Therefore, a portable FHR apparatus using MEMS accelerometer was designed which have the advantage of high safety. A low pass filter was designed and the simulated result from ORCAD shows that this filter is preferable to gain low-frequent FHR signal. Autocorrelation Function (ACF) and spectral analysis were adopted in the FHR signal processing and simulated in MATLAB. The result demonstrates that it can eliminate the noise effectively.

Keywords: MEMS accelerometer; FHR; Autocorrelation Function; Spectrum Analysis

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