

# STRENGTHEN WORKING POINT PLACEMENT DESIGN TO SUPPORT IMPROVED REPRESENTATION PHONOCARDIOGRAM (PCG) REQUIREMENTS ON ELECTRONIC STETHOSCOPE

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## ABSTRACT

The results of this study are to improve the performance of the prototype electro-acoustic human heart rate detection device (electronic stethoscope) through an investigation at the working point of the electronic amplifier whose frequency component content is analyzed using spectral extraction. The objectives of this research are (1) to make a representative electronic stethoscope prototype related to the electronic amplifier working point, and (2) to analyze the composition and content of the frequency components contained in the phonocardiogram signal by spectral extraction.

This study utilizes a prototype human heart rate detection device based on the existing electro-acoustic (electronic stethoscope) principle to record a regenerated heartbeat. Reproduction of heart rate is used to ensure consistency of signal source composition and frequency content. The output of this device is a voltage signal that represents the heart rate. The prototype part has various electronic amplifier working points. The signal is then recorded on a laptop using the Sound Forge 10 application program in the form of a wav file. The signal resulting from this recording is then analyzed the composition and content of its frequency components using spectral extraction. This principle was chosen considering that the heart rate includes beats that contain many components (spectrum).

A prototype electronic stethoscope has been made related to the working point of the electronic amplifier. It turns out that as long as the work point placement ensures that the processed swing signal is balanced (no part of the output amplitude is cut off), the amplifier working point (electronic circuit part) of the electronic stethoscope does not affect the information content or spectrum of the components contained in the recorded signal.

Kata Kunci: *Amplifier Work Point, Phonocardiogram Signal, Electronic Stethoscope*