

ABSTRACT

Electrocardiogram signals have a information that include heart of heart conditions. The normal ECG result of the heart have distinctive characteristics. Irregular heart rhythms or damage to the body can damage the EKG. Measurements using ECG often affected by unwanted noise and can not be eliminated by a simple filter method. In previous research, there are many methods of denoising method for electrocardiogram, method of Discrete Wavelet Transform (DWT) method and Empirical Mode Decomposition (EMD) method.

In this final project will be tested the method of Discrete Wavelet Transform (DWT), Empirical Mode Decomposition (EMD), and combination of both methods. The test was performed using matlab, electrocardiogram signal dataset and some noise was taken from MIT-BIH arrhythmia database with noise 20 dB, 25 dB, 30 dB to be added to electrocardiogram signal. Noisy signal the result filtered using DWT to get best result by using wavelet base of symlet at 2nd level decomposition. Noisy signal the result filtered by EMD to get best result in iteration 4th , because if it is forwarded to next iteration, output of the result denoised signal will be close to flat.

Based on test results obtained MSE 0.008609 dB and SNR 21.1965 dB for 20 dB noise input, MSE 0.002528 dB and SNR 26.5184 dB for noise input 25 dB, MSE 0.000833 and SNR 31.3375 dB for 30 dB noise input with discrete wavelet transforms. In empirical mode decomposition method, the value of MSE 0,003491 dB and SNR 25,117 dB with noise 20 dB, MSE 0,001624 dB and SNR 26,4397 dB with noise 25 dB, MSE 0,00202 dB and SNR 27.4923 dB with noise 30 dB. The final test by combining the both method used, from the test results obtained MSE 0.0059641 dB and SNR 22.7906 dB with noise 20 dB, MSE 0.012624 dB and SNR 27.5323 dB with noise 25 dB, MSE 0.000969233 dB and SNR 30.6817 dB with noise 30 dB. Therefore, it can be said that denoising system using discrete wavelet transform and empirical mode decomposition mode can work effectively and can eliminate noise.

Keywords : ECG, *Denoising*, DWT, EMD, SNR.