DESIGN AND MANUFACTURE OF BAND PASS FILTER FOR OPTIMIZATION POWER TRANSFER IN LOW FREQUENCY SIGNAL; STUDY CASES: EEG SIGNAL

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Abstract

Optimization of power transfer has been done for low frequency signal with study cases of EEG signals. Optimizations were done by analysis of PSD on each frequency band for signals alpha and beta. The objective function of optimization is maximum PSD values and the highest amplitude. Bandwidth frequency of signal is divided into 5 alpha- and beta-4 frequency ranges. Band Pass filters are used to eliminate noise in the signal. The results of PSD analysis is used to obtain of cut-off frequency. The cut-off frequency is one of quantity desired to design Band Pass Filter analog.

The results of this study indicate the optimum bandwidth frequency between 12-13 Hz alpha and beta signaling between 18-22 Hz. Impedance factors of the components Band Pass Filter affects the information carried by the signal. For the 12-13 Hz frequency cut-off value of 0.36 MΩ components $R_1$, $R_3$ and $R_4$ at $3.8 \times 10^4$ Ω while for the 18-22 Hz frequency cut-off value of 0.16 MΩ components $R_1$, $R_3$ and $R_4$ at $2.2 \times 10^4$ Ω.

Key words: Power Spectral Density, optimization, band pass filter, cut off frequency, signal