Abstract

In this final project, the author designed a signal filter to help teachers demonstrate how the highpass filter works. Highpass filter is a signal that passes a signal that is above the cut-off frequency to the cut-off frequency, and holds a signal that is below the cut-off frequency. The transition frequency range used is 20Hz-80Hz.

A highpass filter with a transition frequency range of 20Hz – 80Hz has a gain that increases by -3dB at 80Hz with an initial gain of -20dB with a frequency of 20Hz. The filter method used is analog and digital butterworth filters. In the analog filter, the filter order is sought first which is used to obtain the transfer function of the normalized analog filter. As for the digital filter, it is obtained by using the bilinear transformation of the analog filter transfer function. In analog and digital filters, the authors use a frequency of 300Hz for the passed area and a frequency of 10Hz for the muted area. Unlike the analog filter, the digital filter is affected by the sampling time because the sampling time used in this final project is Ts=0.001s. then the maximum frequency that can be used on a digital filter is only 500Hz

After testing, some research results were obtained as follows. The sampling frequency affects the digital filter, because the sampling frequency causes not all high frequencies to be passed through the digital filter, the maximum frequency allowed is 500Hz. The frequency range that can be passed is 100Hz-500Hz. Using the same input, the results of the analog and digital filter frequencies have the same output

Keywords : *Signal, Highpass Filter, cut-off frequency, ADC and DAC*