

Physics Department

Physics 112

Experiment 10: Filters

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Abstract:

**The aim of experiment is** **to** study the effect of the two types of RC-Filters (high and low pass) on output voltage in terms of:

1- Attenuation (decreasing the amplitude of the input signal).

2- The shape and behavior of the output signal.

**The main result is:**

Calculations:

**GRAPH 1: Low–pass filter: -**

From the graph:

The intersection point is

Note: (we use desmos to find the intersection point)

**Theoretically:**

**GRAPH 2: High-pass filter: -**

From the graph:

The intersection point is

Note: (we use desmos to find the intersection point)

**Theoretically:**

By taking the average value of from high and low pass filters:

Results and conclusion:

This experiment discussed: 1) the difference between low-pass and high-pass filters, as well as 2) how to find the integration and differentiation using the filter circuits: Low and High pass filter. To begin, the theoretical value of omega was found to equal to 10000 rad/s which was relatively close to the experimental values found in the Attenuation vs frequency graphs for both circuits. The experimental value of omega from high and low pass filters is .

In the low-pass filter if  then A is small and output signal is highly attenuated, and if then A is almost 1 and and the signal passed without attenuation. Also if then and.

In the High-pass filter if then A is small and output signal is highly attenuated, and if then A is almost 1 and and the signal passed without attenuation. Also if then and.