

ECE 548: Electronic Design I

Lab 2: Electrical Filters

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Objectives

- Become more familiar with the function generator and oscilloscope.
- Observe the effects of a circuit in terms of its transfer function.
- Determine the type of filtering of an electrical filter

In-Lab Procedure

1. Construct the circuit in figure 1 using the following values.

$$R_1 = 4.7 \text{ K}\Omega \quad C_1 = 0.01 \text{ }\mu\text{F} \quad R_2 = 56 \text{ K}\Omega \quad C_2 = 0.1 \text{ }\mu\text{F}$$

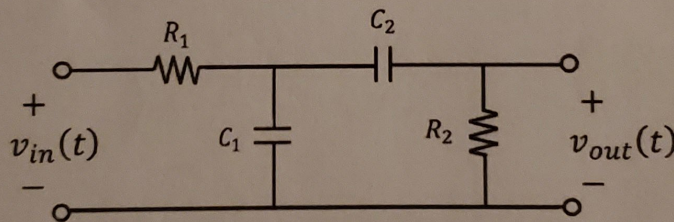


Figure 1

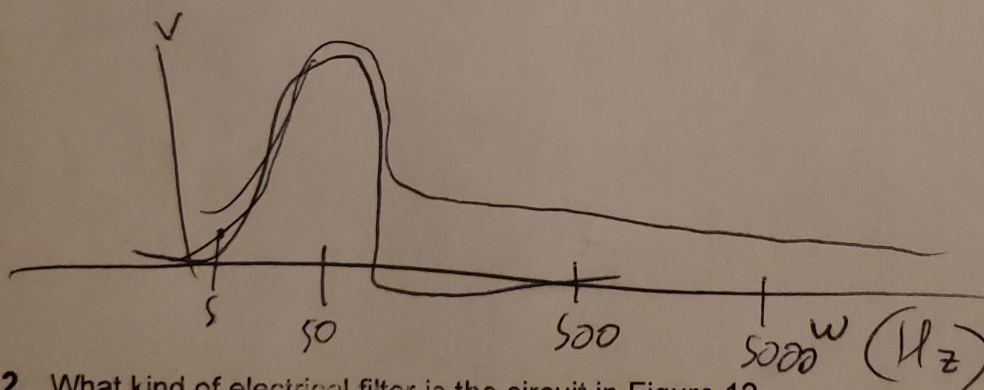
Set the function generator to 1 Hz and use the oscilloscope to set the amplitude of the function generator to 10 V peak-to-peak. Measure the peak-to-peak amplitude of the circuit output at the given frequencies in table 1 and enter them in the table. Using 10 V as the input voltage, calculate the gain of the circuit, and enter these values in Table 1.

$$Gain = \frac{A_{out\,pp}}{A_{in\,pp}}$$

Frequency (Hz)	Amplitude (V _{p-p})	Gain
1	N/A	N/A
3	N/A	N/A
5	27	2.7
7	36	3.6
10	5.8	5.8
30	11.8 194	15.4 11.8
50	18 178	17.8 18
70	71 72	7.1 7.2
100	14 74	1.4 7.4
300	26	2.6
500	22	2.2
700	9.2	0.92
1,000	7.6	0.76
3,000	6.8	0.68
5,000	5.2	0.52
7,000	4.4	0.44
10,000	3.2	0.32
30,000	1.2	0.12
50,000	1.2	0.12

Table 1

- Plot the measured gain values using a logarithmic scale for the frequency axis (in Hz) and a linear scale for the gain.



- What kind of electrical filter is the circuit in Figure 1?

Band Pass

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