

EXPERIMENT 8

LC FILTERS 2

Frequency characteristics of Bandpass and Bandreject Filters

PRELIMINARY WORK

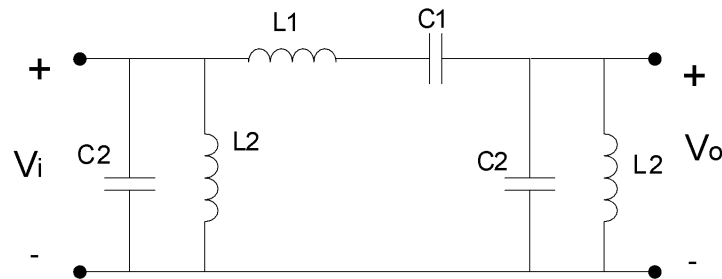


Figure 1 $L1=75\text{mH}$, $C1=0.01\mu\text{F}$, $C2=0.15\mu\text{F}$, $L2=5\text{mH}$

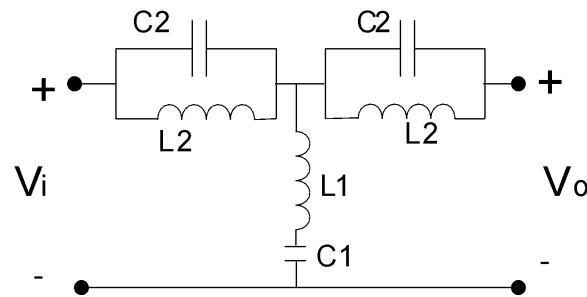


Figure 2 $L1=75\text{mH}$, $C1=0.01\mu\text{F}$, $C2=0.15\mu\text{F}$, $L2=5\text{mH}$

P1 For the filter given in Figure 1

- Compute voltage gain of the filter at zero frequency, at the resonant frequency of the resonators, and at infinite frequency
- What is the type of this filter?
- What is the value of the gain at the resonant frequency if the coils are considered (10 ohm for 75mH and 5 ohm for 5mH inductors)
- Use PSPICE to plot the gain curve of filter**

P2 Repeat P1 for the filter shown in Figure 2

EXPERIMENTAL WORK

E1 Consider the filter in Figure 1. Measure the center frequency f_0 , and cut-off frequencies f_1 , f_2 of the filter by taking sufficient number of output data. Apply a $2V_p$ square wave as the input voltage, observe and plot the output voltage on CRO for frequencies 1, 6, 10 kHz

E2 Repeat the procedure of E1 for the filter in Figure 2

CONCLUSION

C1 Compute the quality factor of the filters tested in E1 and E2. Compare them with the quality factor of the coils (at resonant frequencies) used in these filters.

C2 Specify the pass bands and stop-bands of the tested filters in this experiment.

C3 At 6 kHz, which of the filters shown in figures 1 and 2 give an output similar to the input square wave, why? Which output contains more spikes, why?

C4 Repeat C3 for 1kHz and 10 kHz input signals