

Part 1:

1) Build the filter shown below. Is it a high pass or low pass filter?

2) Calculate the filter's f_{3dB} frequency.

3) Measure the f_{3dB} frequency. This is the frequency where $V_{out}/V_{in} = 0.707$. Compare it to the calculated f_{3dB} point.

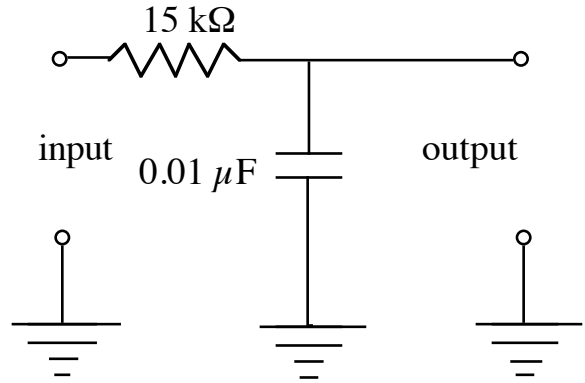
4) Using the measured f_{3dB} frequency, measure V_{out} and V_{in} , at the following frequencies: $f_{3dB}/2$, $2f_{3dB}$, $3f_{3dB}$, $4f_{3dB}$,

$8f_{3dB}$ and $10f_{3dB}$. Then make a plot of $(\frac{V_o}{V_{in}})$

vs. frequency (include the measurement of f_{3dB}). Print this out twice. Once with a regular scale, and once with a log-log scale.

5) Measure the phase shift when $f \ll f_{3dB}$, $f = f_{3dB}$ and $f \gg f_{3dB}$.

Recall $\phi = 2\pi \Delta t / T = 2\pi \Delta t f$ so if you measure the shift in time, Δt you should be able to calculate the phase in radians or degrees. Does the output Lead or Lag the input in each case?



Part 2:

1) Build the filter shown at the right. Is it a high pass or low pass filter?

2) Calculate the filter's f_{3dB} frequency.

3) Measure the f_{3dB} point. This is the frequency where $V_{out}/V_{in} = 0.707$. Compare it to the calculated f_{3dB} point.

4) Using the measured f_{3dB} point, measure V_{out} and V_{in} , at the following frequencies: $2 f_{3dB}$, $f_{3dB}/2$, $f_{3dB}/3$, $f_{3dB}/4$, $f_{3dB}/8$ and $f_{3dB}/10$. Then make a plot of V_{out}/V_{in} vs. frequency. Print this out twice, once with a regular scale, and once with a log-log scale.

5) Measure the phase shift for $f \ll f_{3dB}$, $f = f_{3dB}$ and $f \gg f_{3dB}$. Does the output Lead or Lag the input in each case?

