Electrotechnology
Lab report #4

Marek Betka

16324334

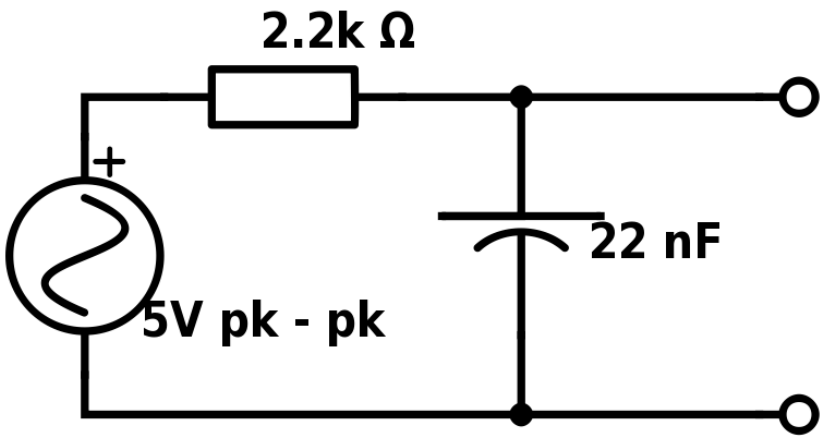
9/12/2016 (Lab 1: 2.00-4.00pm)

Simple Low Pass Filter

Method:

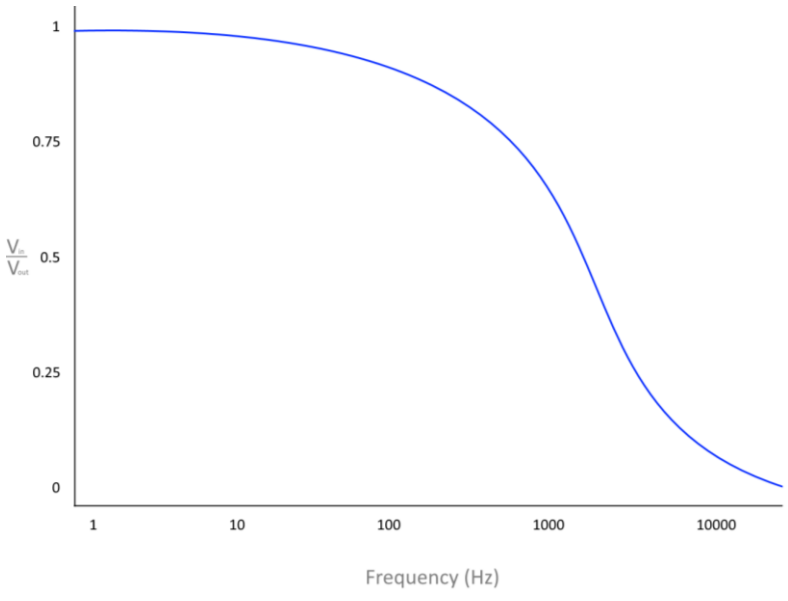
1. The circuit was set up as shown in the diagram.
2. The input frequency was set to 100 Hz and the voltage in and voltage out were noted
3. The frequency was then increased by 500 Hz and the voltage in and out were noted again
4. This procedure of adding 500 Hz was continued until results were noted from 100 Hz to 20k Hz
5. These results were then used to plot a graph of the voltage in and out with respect to frequency.

Circuit Diagram



Results:

The results taken when graphed results create the following graph:



Interpretation:

At low frequencies, the capacitor has time to charge and once it matches the input voltage it will not let current flow and decreases it procedurally. This essentially acts as a short circuit for the low frequencies, and resembles more and more of an open circuit as the frequency increases.

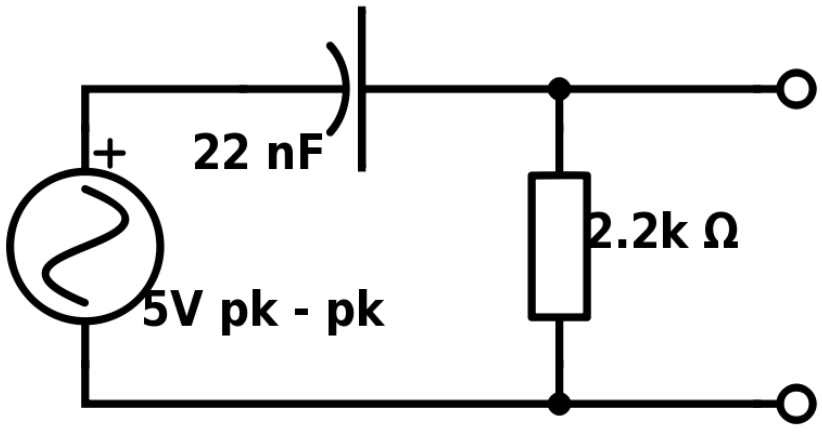
At higher frequencies the capacitor lacks time to charge and discharge so it is ignored, and the difference between the input voltage and the output voltage becomes greater and greater with the resistor.

Simple High Pass Filter

Method:

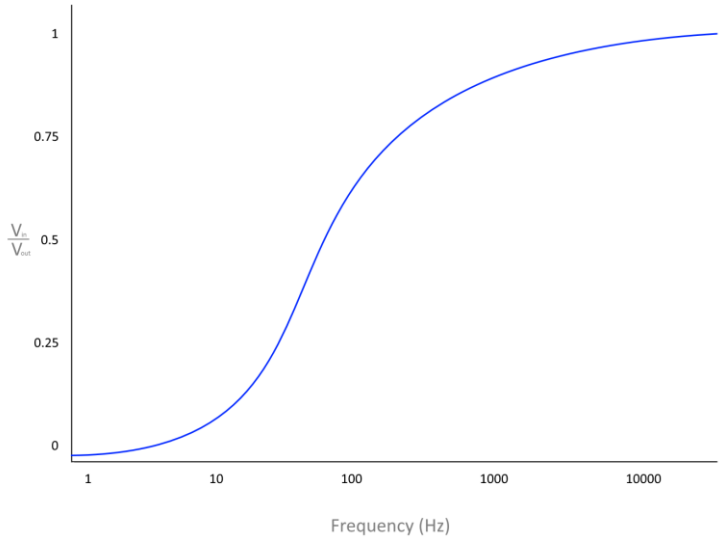
1. The method for this part is the same as the low pass filter but with the capacitor and the resistor having been replaced.
2. The circuit was set up as shown in the diagram.
3. The input frequency was set to 100 Hz and the voltage in and voltage out were noted
4. The frequency was then increased by 500 Hz and the voltage in and out were noted again
5. This procedure of adding 500 Hz was continued until results were noted from 100 Hz to 20k Hz
6. These results were then used to plot a graph of the voltage in and out with respect to frequency.

Circuit Diagrams:



Results:

The results taken when graphed results create the following graph:



Interpretation:

The high pass filter works in a very similar way to the low pass filter however instead of allowing voltages at small frequencies to pass, it allows voltages at high frequencies to pass.

At low frequencies the capacitor is allowed to charge up fully which makes a difference between the voltage in and voltage out.

As the frequency increases the capacitor does not have enough time to charge and the voltage in and out becomes more and more similar.

Uses of a High and Low pass filter:

One application of a low pass filter is in speaker systems, more specifically the low end or bass frequency sound which goes into a “Woofer” or “Sub-Woofer”. This reduces any high frequency distortion into the speaker. The high pass filter removes the low end part of sound and only allows high frequency electricity, and as a result only high frequency sound is allowed pass into a smaller speaker called a “Tweeter”. This division of audio into highs and lows allows speaker systems to more accurately represent sound, increasing the quality of the musical experience.