PostLab03

Q1. The peak-to-peak amplitude of the generated signal is 2.40 V

Q2. The DC offset is 1.76 V

Q3. The frequency is 2.1 kHz

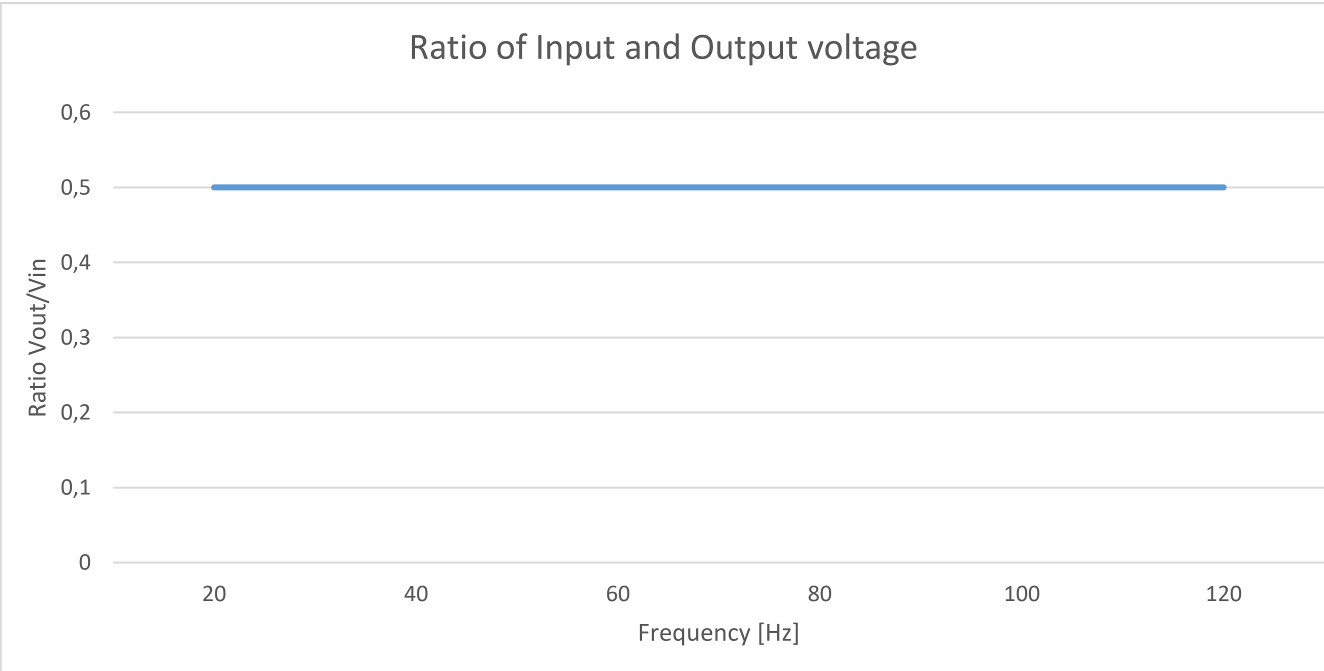
Q4. A measure a whole period it takes 500us and we are measuring 120 points. So, for one point T= 4.167us (=0.004167ms) is needed. Which is a frequency of 240 kHz (f=1/T)

Q5. The minimum is 0.560V and the maximum is about 3V. The voltage range is [0.56,3] and the voltage resolution is 2.4V/4096 = 0.5859 mV

Q6.

Frequency [Hz]	Peak-to-peak [V]
20 Hz	1.2
40 Hz	1.2
60 Hz	1.2
80 Hz	1.2
100 Hz	1.2
120 Hz	1.2

As we can see from the table the peak-to-peak voltage stayed constant over all frequencies. Since the system only consists of resistors the voltage is divided.



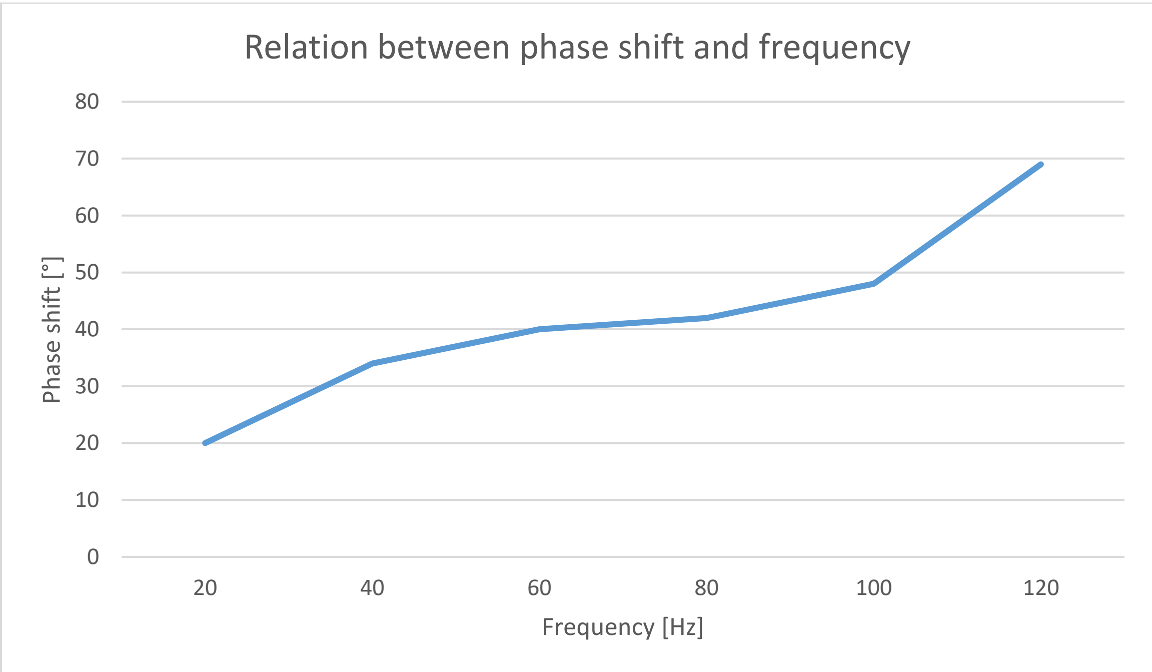
The delay is calculated with the following equation: $\text{delay} = \frac{1}{120 * f} + 4.167 * 10^{-6}$ [s]

The equation considers the number of samples (120) and the execution speed of the

Q7.

Frequency [Hz]	Peak-to-peak [V]	Phase shift [°]	Phase shift [ms]
20	2.4	20	2.778
40	2.16	34	2.362
60	2	40	1.852
80	1.76	42	1.458
100	1.52	48	1.334
120	0.96	69	1.597

Plot of output and voltage ration!



In this plot we can clearly see that the phase shift increases with increasing frequency. This can be explained with the fact that we changed the resistor with a capacitor. The characteristic of a capacitor is that it delays changes in frequency. So in the capacitor a phase shift is occurring. It's a low pass filter

Q8. Changing the position of the resistive and capacitive element will lead to the opposite outcome of the circuit used for question 7. The phase shift will decrease with increasing frequencies and the peak-to-peak values will increase. It is a high pass filter.