EKPO, DEBORAH JOSEPH

17/ENG02/019

COMPUTER ENGINEERING

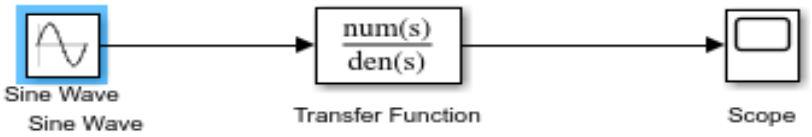
CLASSWORK 1- ENG 342

a.

- Filter Circuits are used to eliminate background Noise
- They are used in Radio tuning to a specific frequency
- Used in Pre-amplification, Equalization, Tone Control in Audio Systems
- They are also used in Signal Processing Circuits and Data Conversion
- Filter Circuits are extensively used in Medical Electronic Systems

b. **Designing a Low-Pass Filter with 0.005Ω resistor and 0.01F capacitor**

A 100V Amplitude was selected with a frequency of 1Hz for the Sine Wave Source.



c. **Determining the Cut-off frequency**

The cut-off frequency: $f_C = \frac{1}{2\pi RC}$

When R= 0.005Ω and C= 0.01F

$F = \frac{1}{2*3.142*0.005*0.01} = 3.182X10^3$

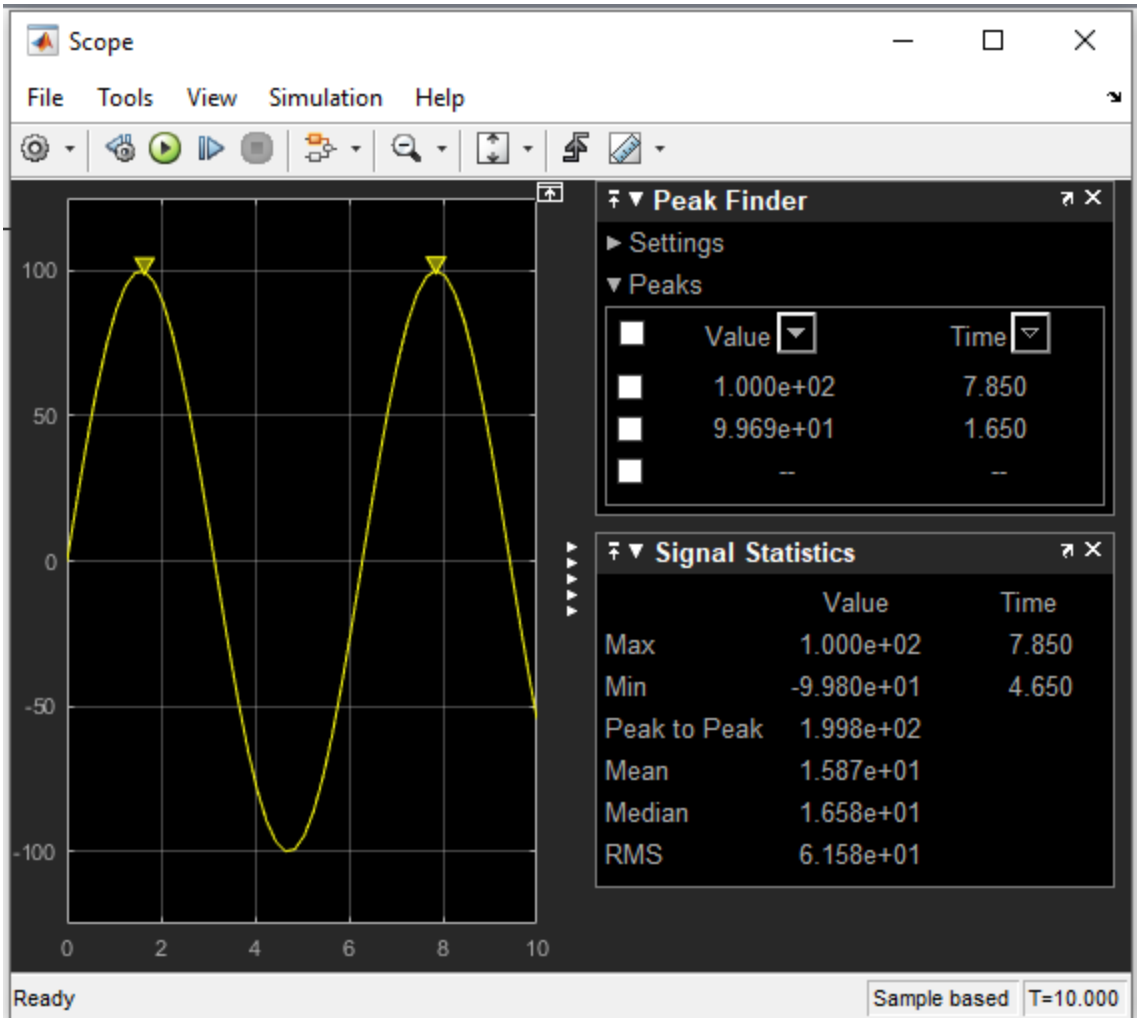
d. Design Output

The transfer function equation for the circuit is given as

(1/RC)/(S + 1/RC)

When R= 0.005Ω and C= 0.01F

Transfer Fcn=(1/0.005*0.01)/(S + (0.005*0.01))= (20000)/(s+ 20000)



e. If two signals of 5 KΩ and 2 KΩ are pass through the filter at different intervals. Discuss your observation

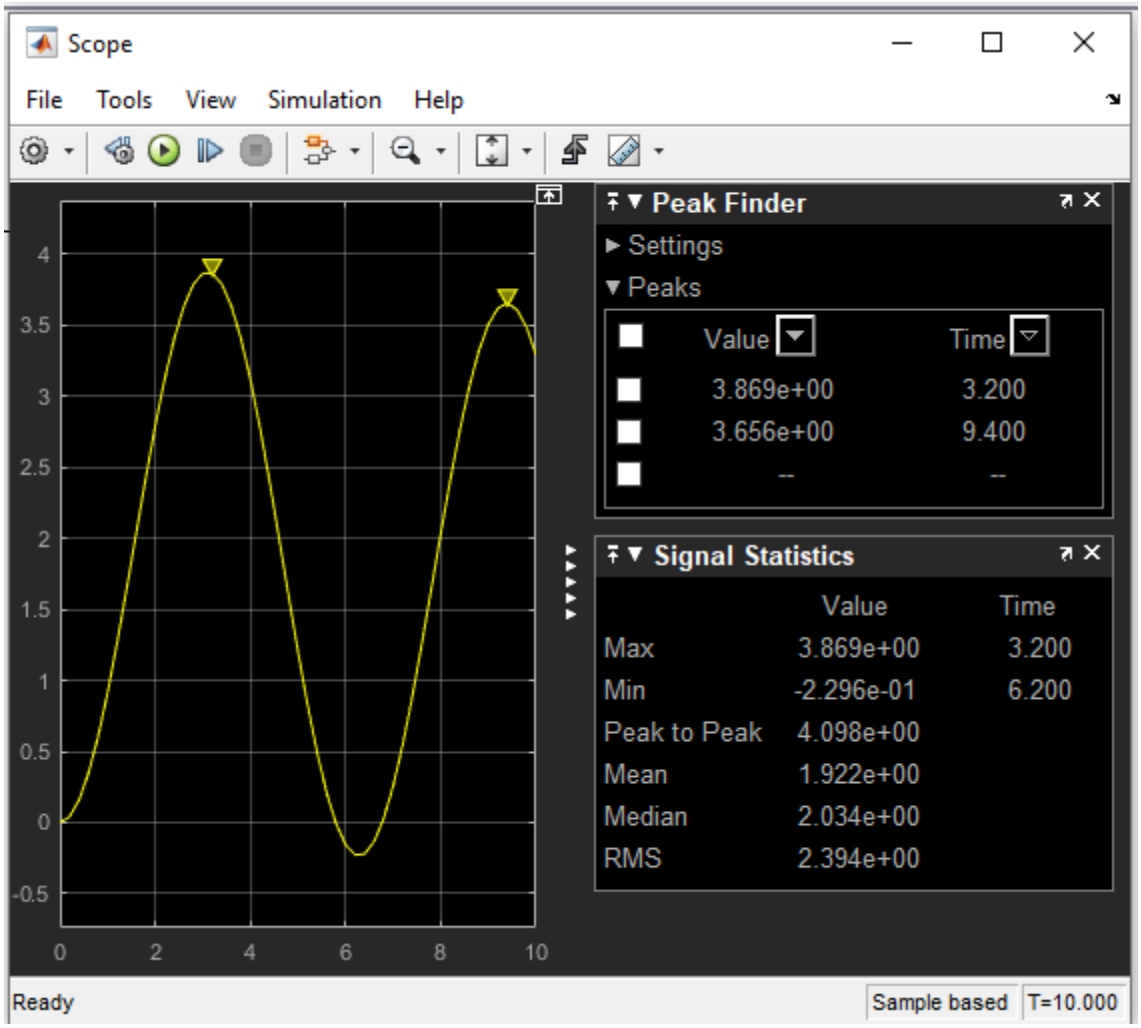
When the signal of 5 KΩ is passed through the filter, the following result is obtained:

The transfer function equation for the circuit is given as

(1/RC)/(S + 1/RC)

When R= 5000Ω and C= 0.01F

Transfer Fcn=(1/5000*0.01)/(S + (5000*0.01))= (0.02)/(s+ 0.02)



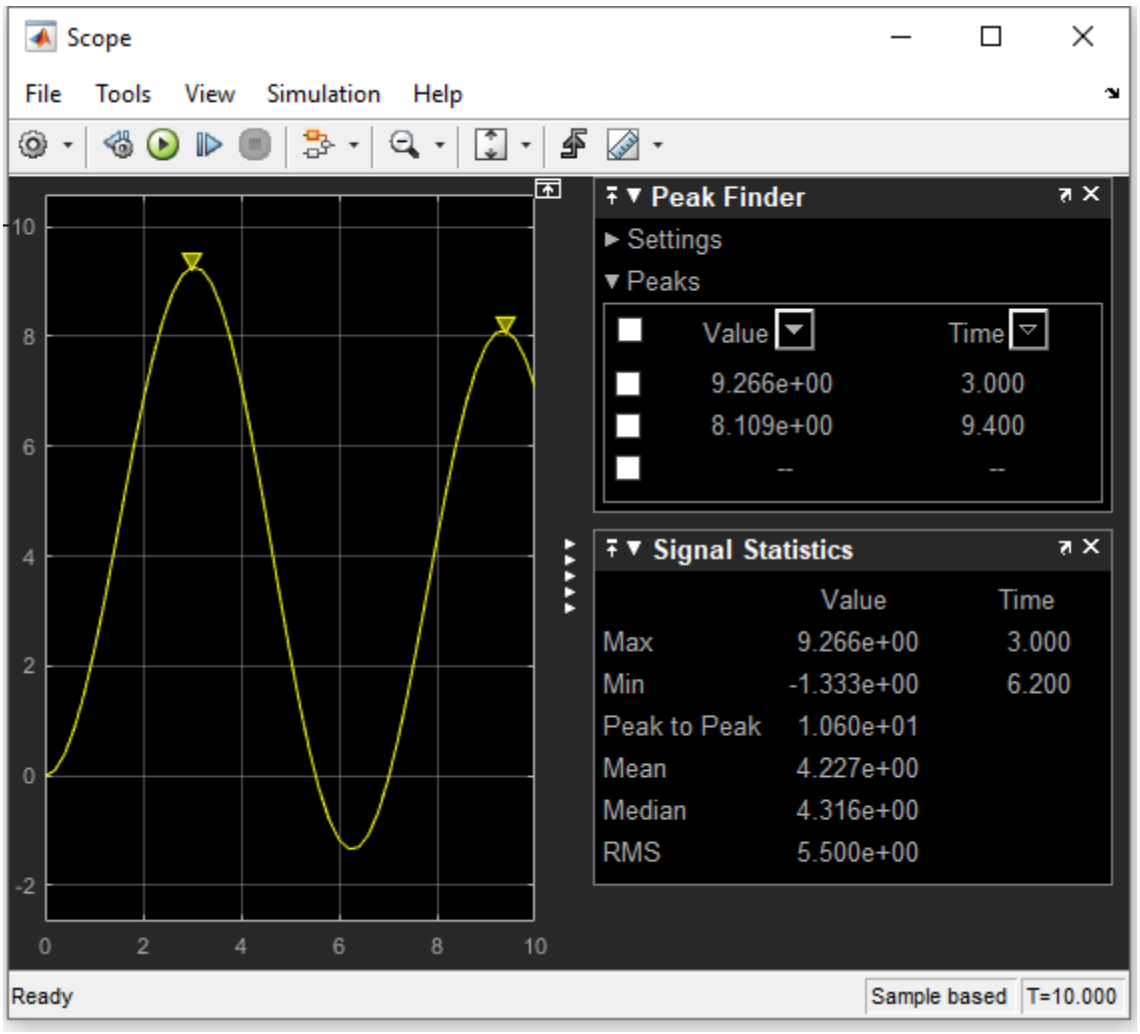
Observations: The signal is attenuated to 3.869 ohms

When the signal of 2K ohms is passed through the filter the following results are obtained:
The transfer function equation for the circuit is given as

(1/RC)/(S + 1/RC)

When R= 2000Ω and C= 0.01F

Transfer Fcn=(1/2000*0.01)/(S + (2000*0.01))= (0.05)/(s+ 0.05)



Observations: The signal is attenuated to 9.266 ohms