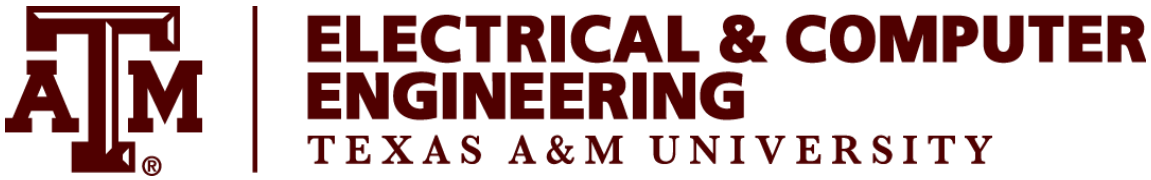

Post-Lab 1: First Order Circuits

Kylan Lewis

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ECEN 325 -501

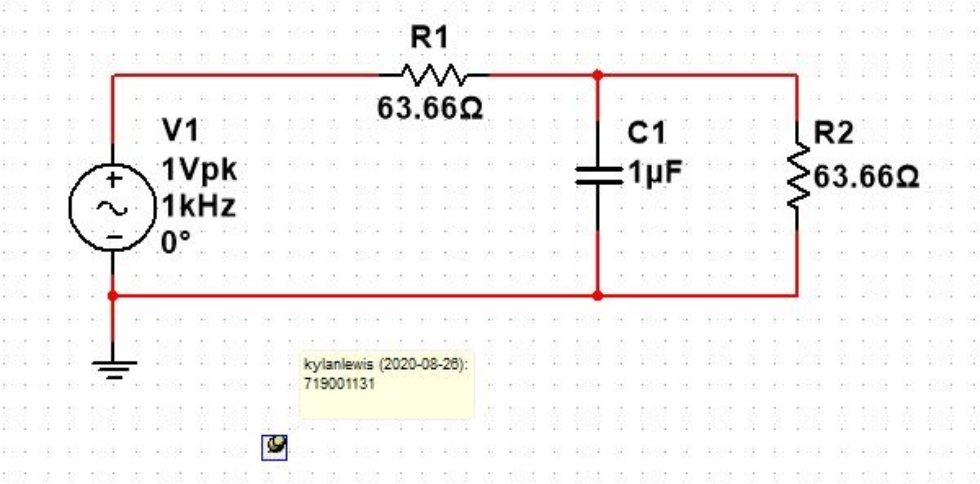
TA: Jian Shao

Date: 8/26/2020

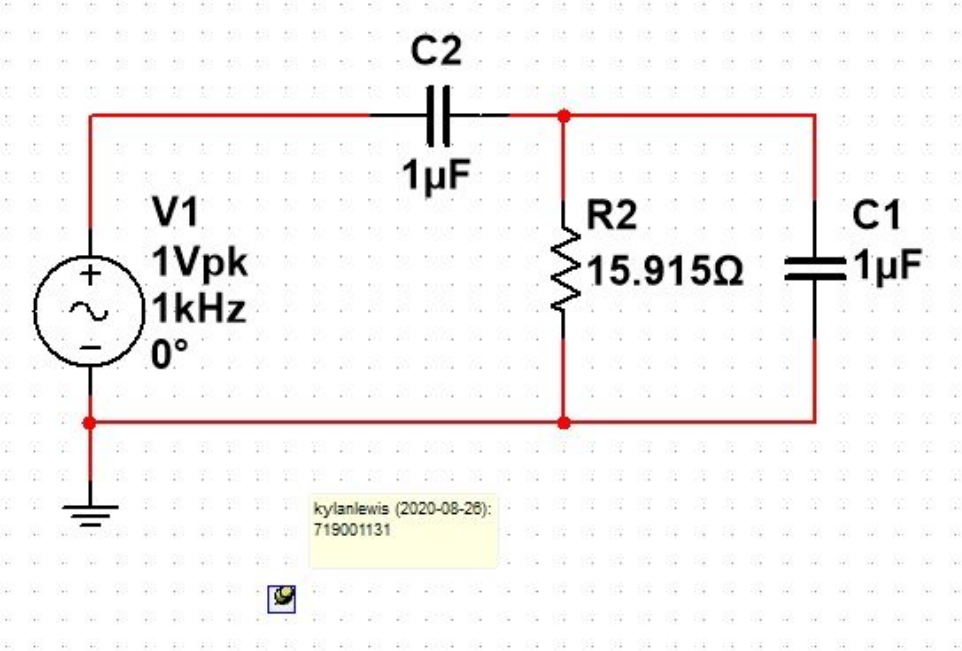
Simulations:

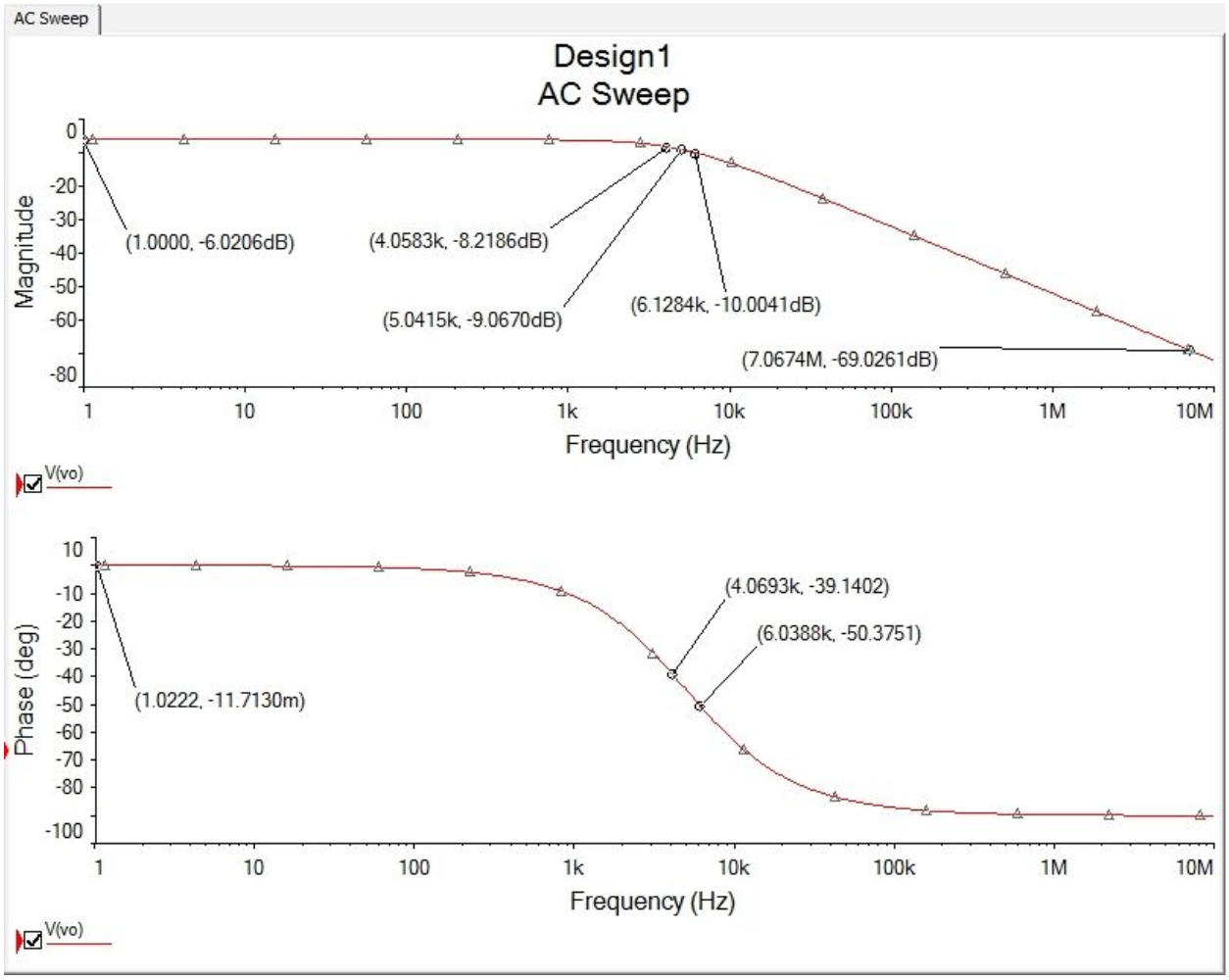
Schematics:

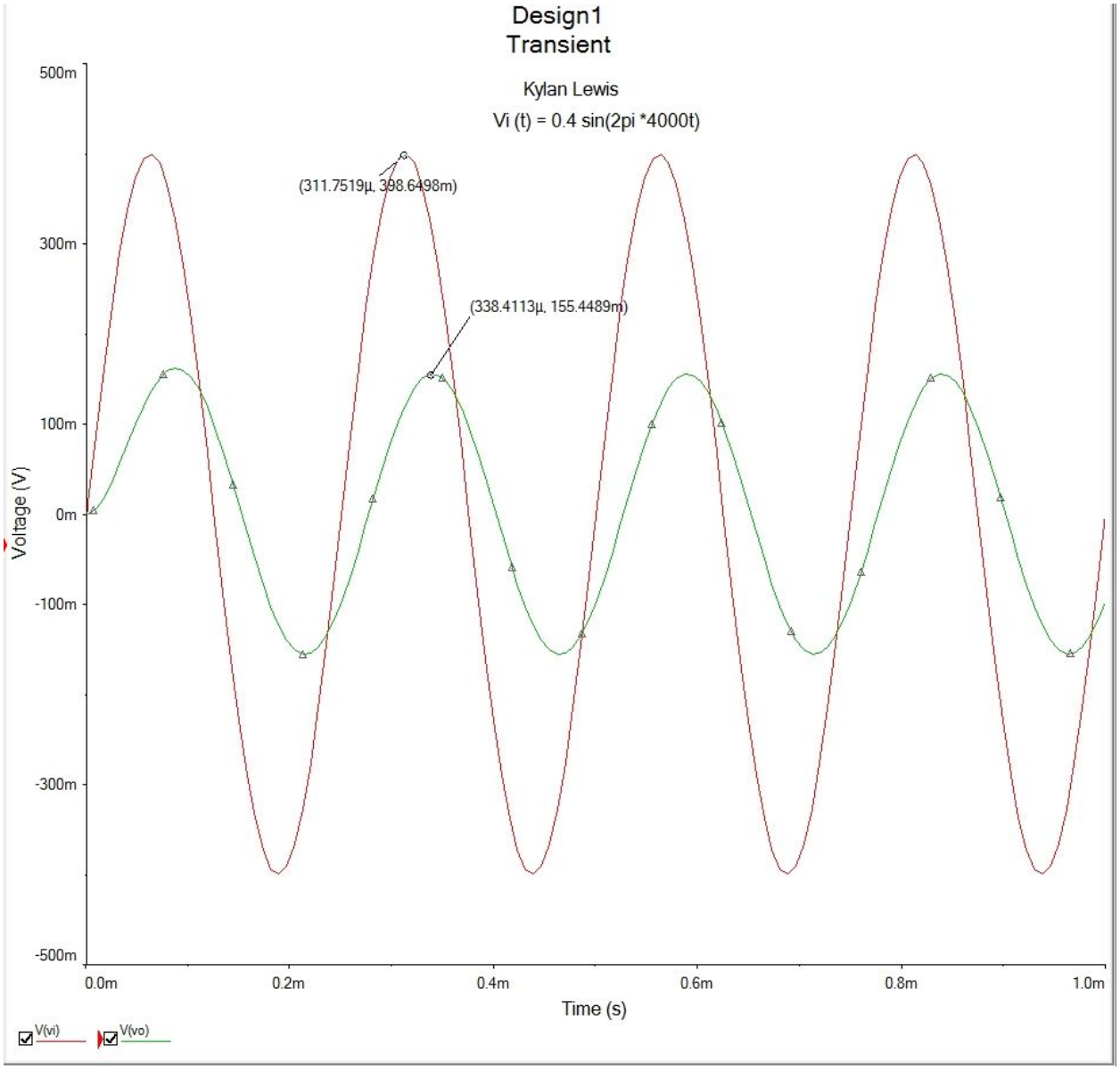
Lowpass Filter:



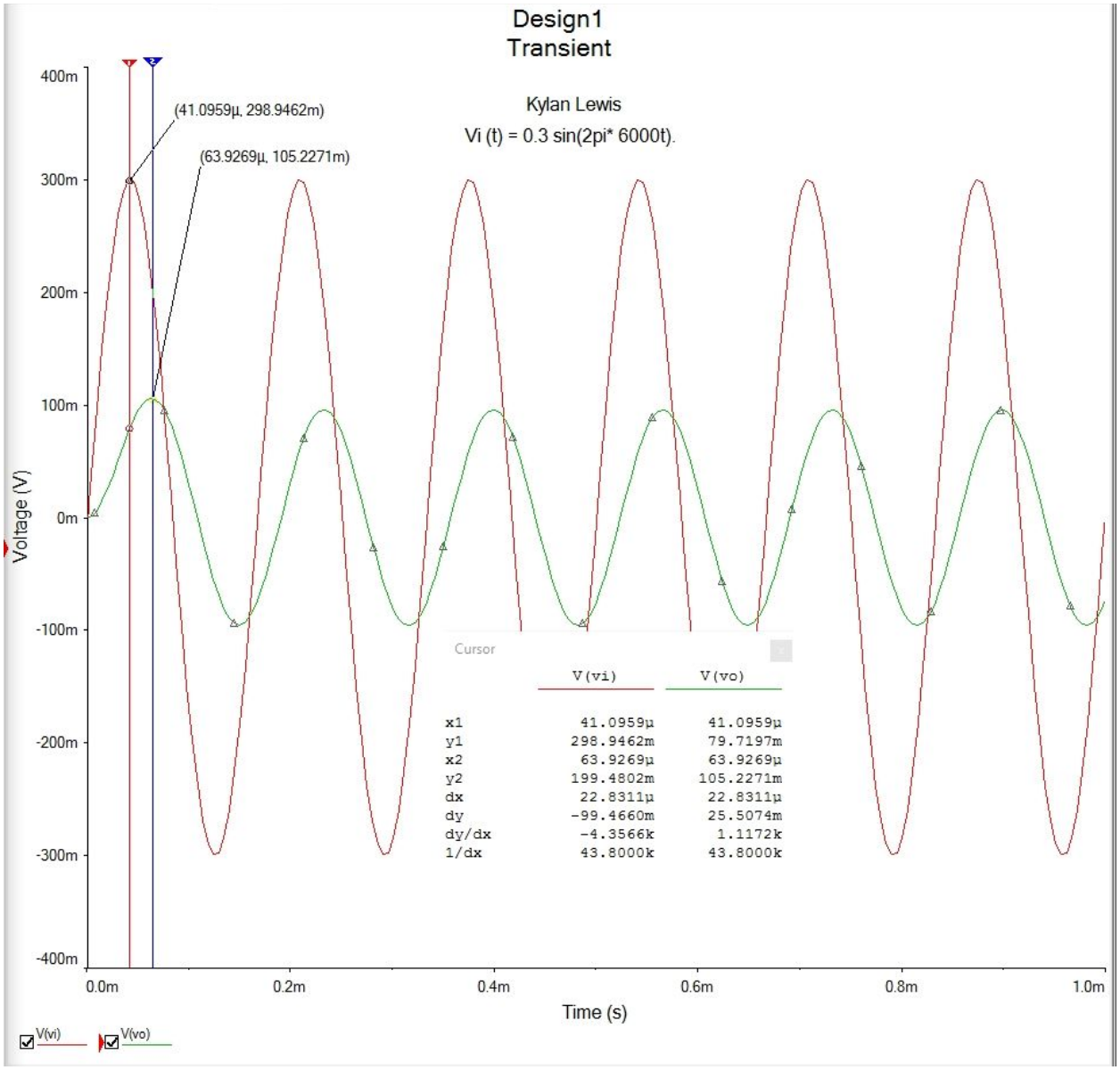
High Pass Filter:



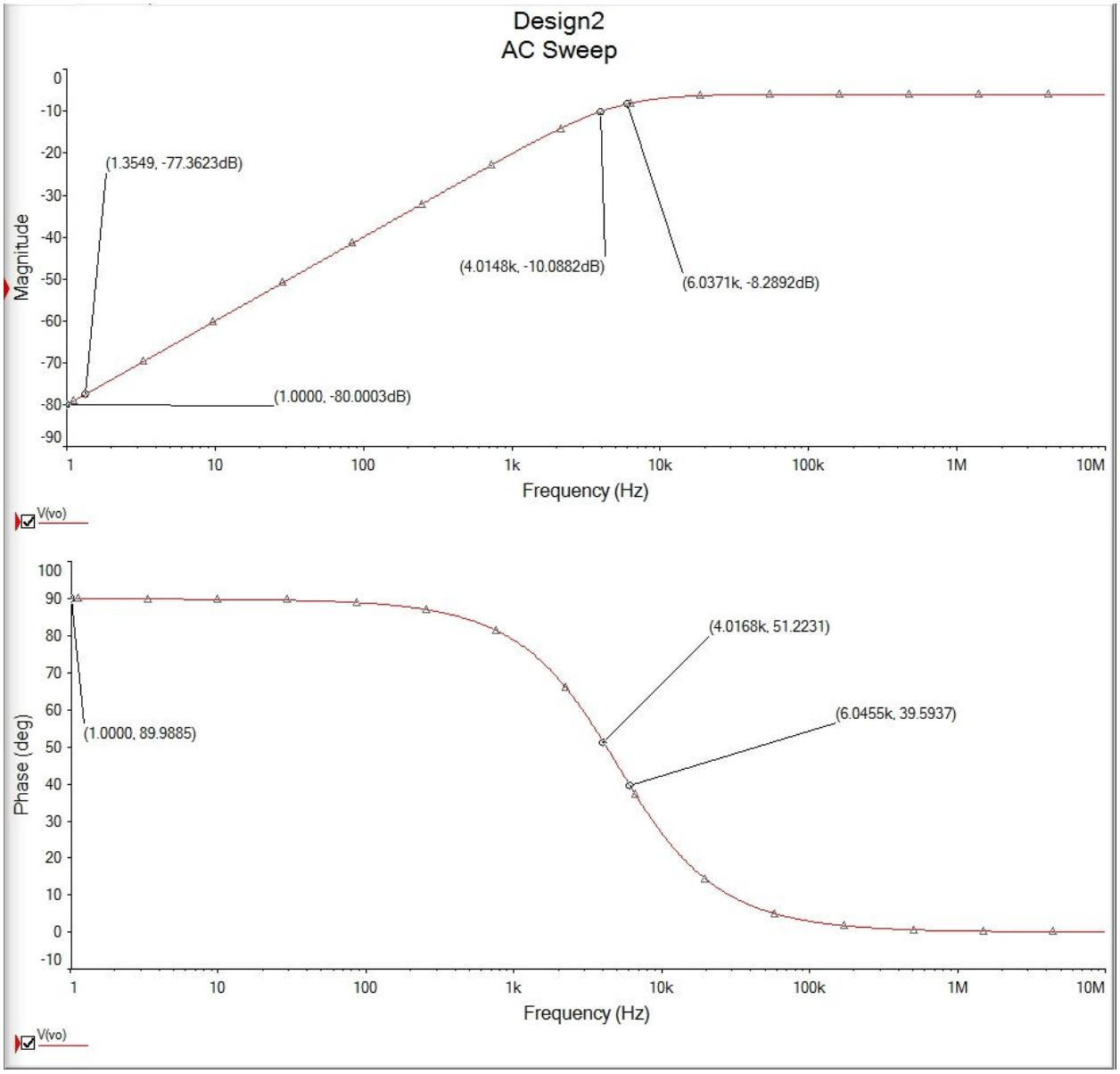

AC Sweep
Design1
AC Sweep
Magnitude
0
-20
-30
-40
-50
-60
-80
(1.0000, -6.0206dB)
(4.0583k, -8.2186dB)
(5.0415k, -9.0670dB)
(6.1284k, -10.0041dB)
(7.0674M, -69.0261dB)
1
10
100
1k
10k
100k
1M
10M
Frequency (Hz)
V(vo)
Phase (deg)
10
-10
-20
-30
-40
-50
-60
-70
-80
-100
(4.0693k, -39.1402)
(6.0388k, -50.3751)
(1.0222, -11.7130m)
Frequency (Hz)
V(vo)

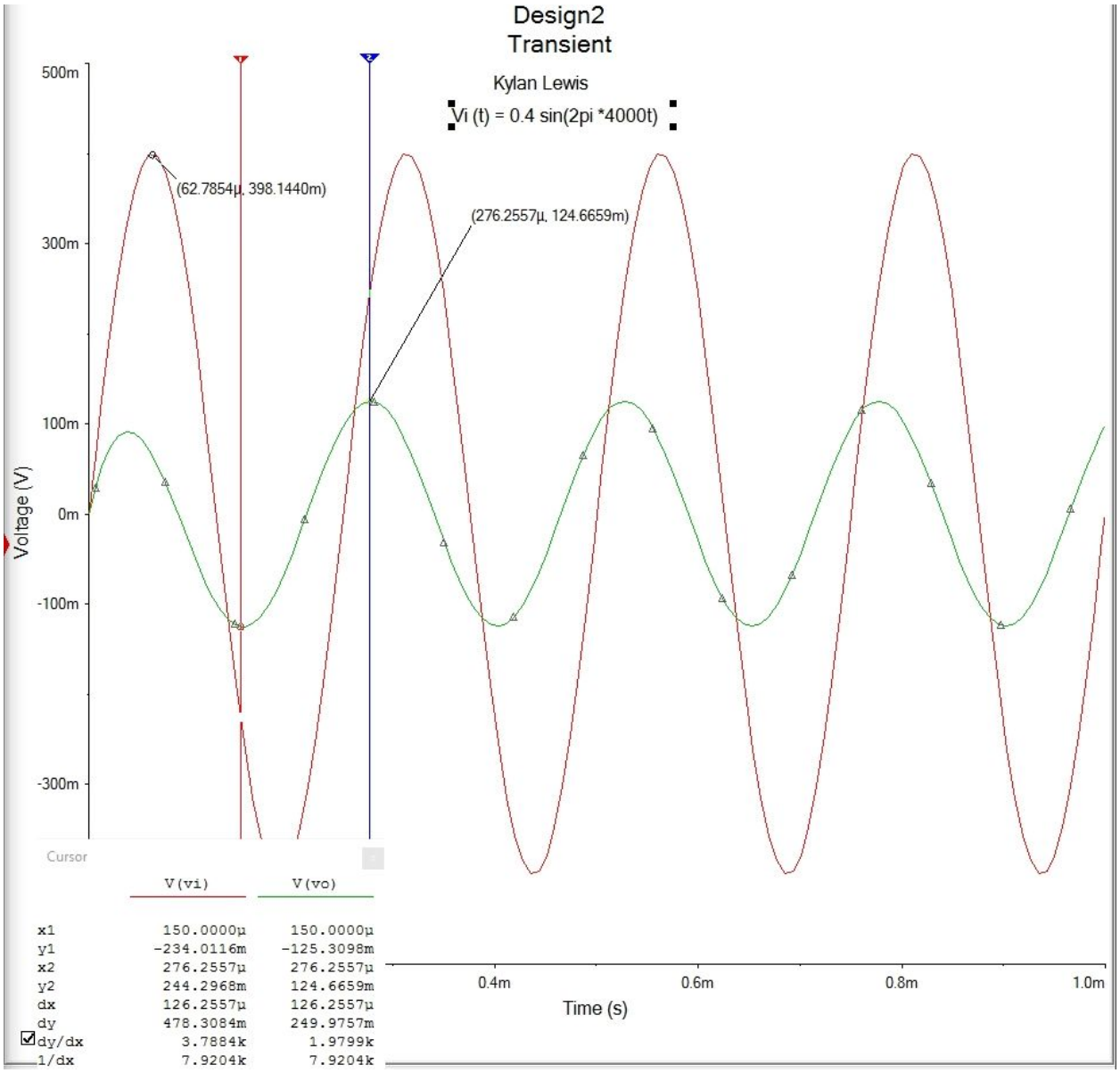


Transient for Vi (t) = 0.4 sin(2pi *4000t)

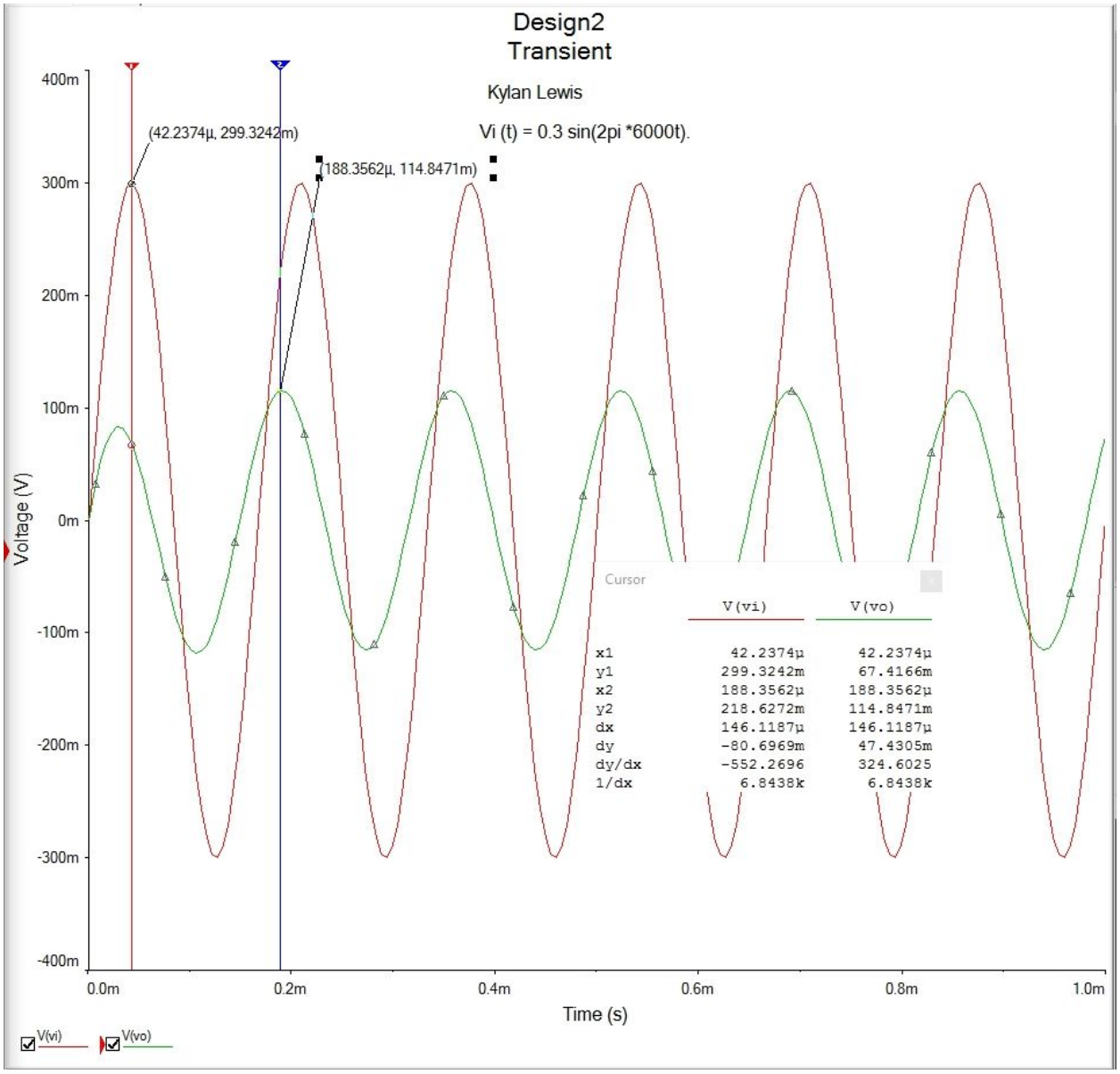


Transient for Vi (t) = 0.3 sin(2pi* 6000t).


Design2
AC Sweep
Magnitude
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
(1.3549, -77.3623dB)
(4.0148k, -10.0882dB)
(6.0371k, -8.2892dB)
(1.0000, -80.0003dB)
1
10
100
1k
10k
100k
1M
10M
Frequency (Hz)
V(vo)
Phase (deg)
100
90
80
70
60
50
40
30
20
10
0
-10
(4.0168k, 51.2231)
(6.0455k, 39.5937)
(1.0000, 89.9885)
Frequency (Hz)
V(vo)



Transient for Vi (t) = 0.4 sin(2pi *4000t)



Transient for Vi (t) = 0.3 sin(2pi *6000t).

Kylan Lewis (719001131)

Measurements:

1.

	Low Pass Filter		High Pass Filter	
	Magnitude	Phase	Magnitude	Phase
3-dB Frequency	5.0415 k	N/A	1.3549	N/A
Passband gain	-6.1909 dB	-11.7130 mHz	-80.003 dB	89.9885 Hz
4kHz	-8.01793 dB	-39.1402 Hz	-10.0882 dB	51.2231 Hz
6kHz	-9.9018 dB	-50.3751 Hz	-8.2892 dB	39.5937 Hz

2.

	Low Pass Filter	High Pass Filter
Magnitude Vin	398.6498 mV	398.1440 mV
Magnitude Vout	155.4489 mV	124.6659 mV
Time Vin	.3117519 ms	.0627854 ms
Time Vout	.3384113 ms	.2762557 ms

3.

	Low Pass Filter	High Pass Filter
Magnitude Vin	298.9462 mV	299.3242 mV
Magnitude Vout	105.2271 mV	114.8471 mV
Time Vin	.2989462 ms	.0422374 ms
Time Vout	.10522771 ms	.1883562 ms

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Question from the TA:

My question related to this video (between 18:00 and 28:00) is,
Why does the student in the video use 1.8KOhm and 2.2KOhm resistor instead of 1KOhm resistor? Why do you think it is good enough to do that?

Answer: The student in the video does not have a 1 KOhm resistor so instead, he uses a 1.8KOhm and 2.2KOhm resistor in parallel.

1.8KOhm || 2.2KOhm = 0.99KOhm, which is very close to 1KOhm.

This is a good idea because the resistor values are generally not that accurate, they come with a tolerance (for example, ±5%). This being said 0.99 KOhms is close enough to the real resistor that he would not see any significant difference.