EXPERIMENT

IMPLEMENT RECTIFIER AND DIFFERENTIATOR USING OPAMP

Objective

This lab is aimed at implementing a rectifier and differentiator design using opamp on breadboard and LTSpice.

Tasks

1) Half- Wave Rectifier (Breadboard and LTSpice)

a) Implement the circuit given in figure 1 in breadboard. Make the voltage source as an AC source (Sine wave) at a frequency of 60Hz and amplitude 5V.

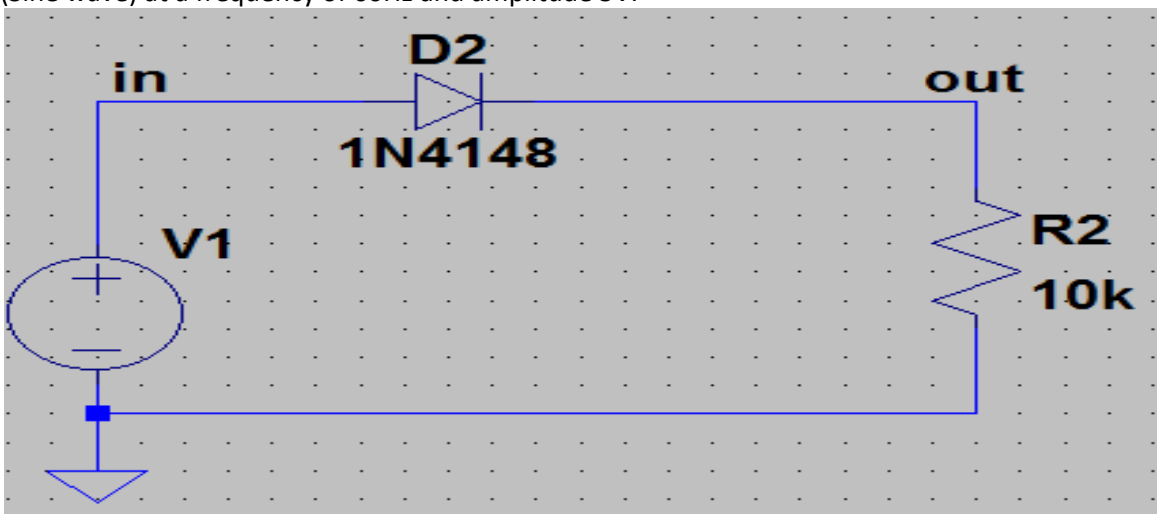

Figure 1

b) Observe the input and output voltage waveforms on CRO and Record their peak amplitudes.

c) Implement the circuit shown in figure 1 in LTSpice and repeat step 1(b).
[Diode(component name D) is available in the component tab. Place it on the design. Then right click on the diode and hit "pick new diode". A list will pop-up, select the diode 1N4148 from the list.]

d) Implement the circuit shown in figure 2 in LTSpice and repeat step 1(b).

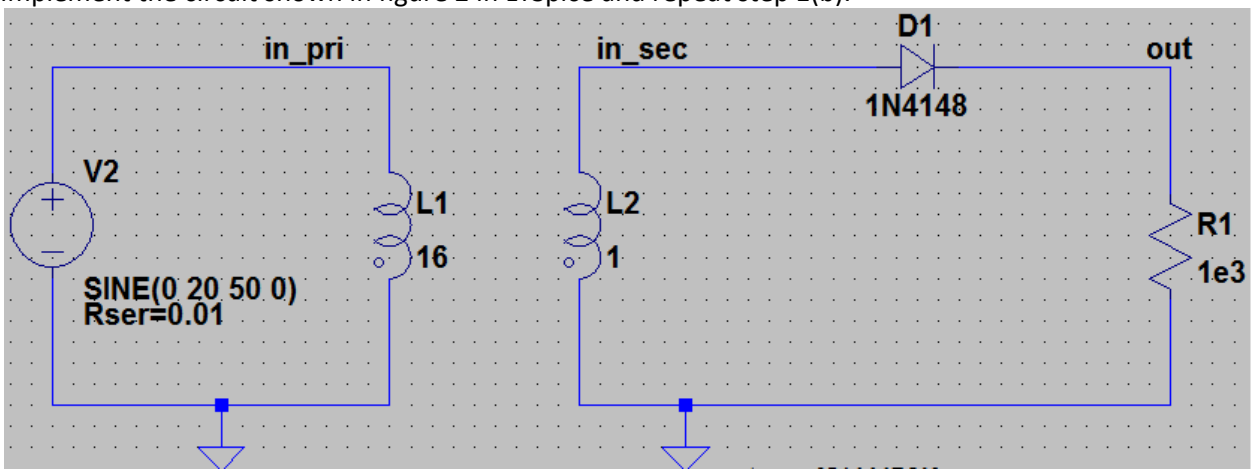

Figure 2

e) Here L1 and L2 acts as a transformer. Write the spice directive "K1 L1 L2 1" and place on the design.

2) Full- Wave Reactifier (LTSpice)

a) Implement the circuit shown in figure 3 in LTSpice and observe the input and output voltage waveforms on CRO and Record their peak amplitudes.

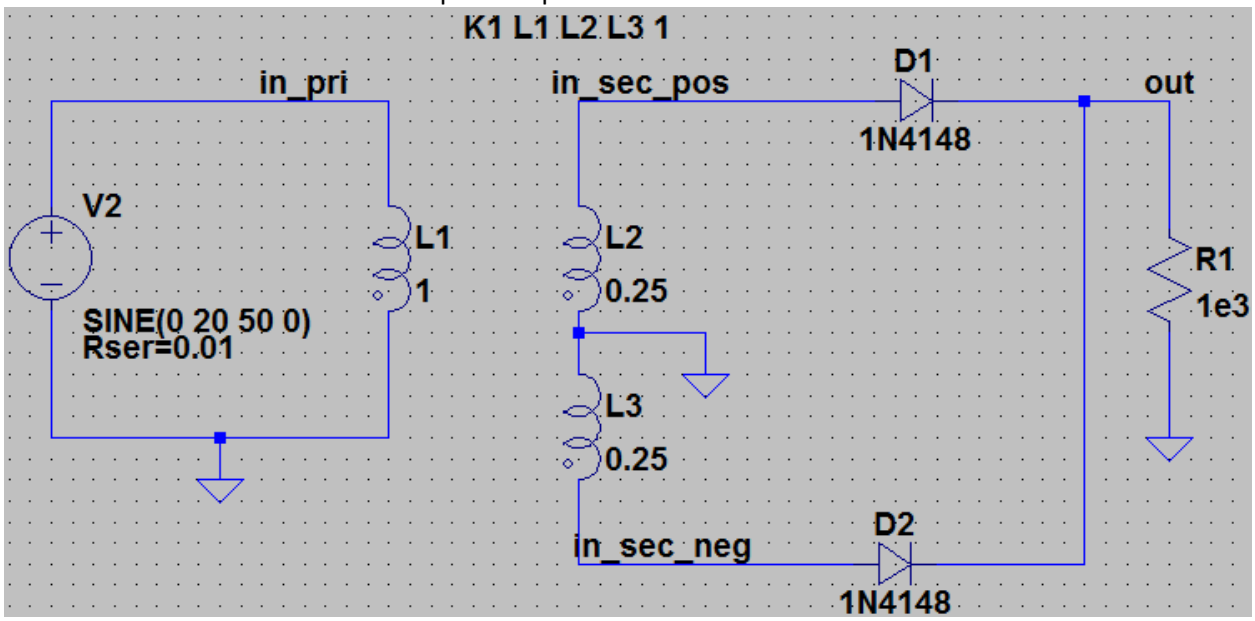

Figure 3

b) Implement the circuit shown in figure 4 in LTSpice and observe the input and output voltage waveforms on CRO and Record their peak amplitudes.

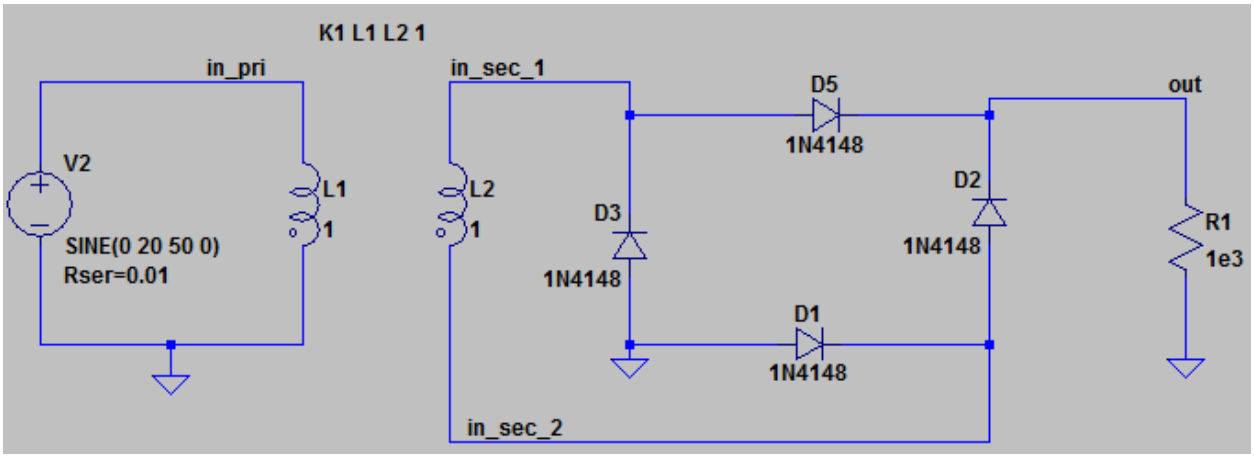

Figure 4

3) Differentiator (LTSpice)

a) Implement the circuit shown in figure 5 in LTSpice and observe the input and output voltage waveforms on CRO and Record their peak amplitudes.

b) Make the voltage source V1 as piece-wise linear. Verify that the area under the input waveform is equal to the value of output waveform at a given time.

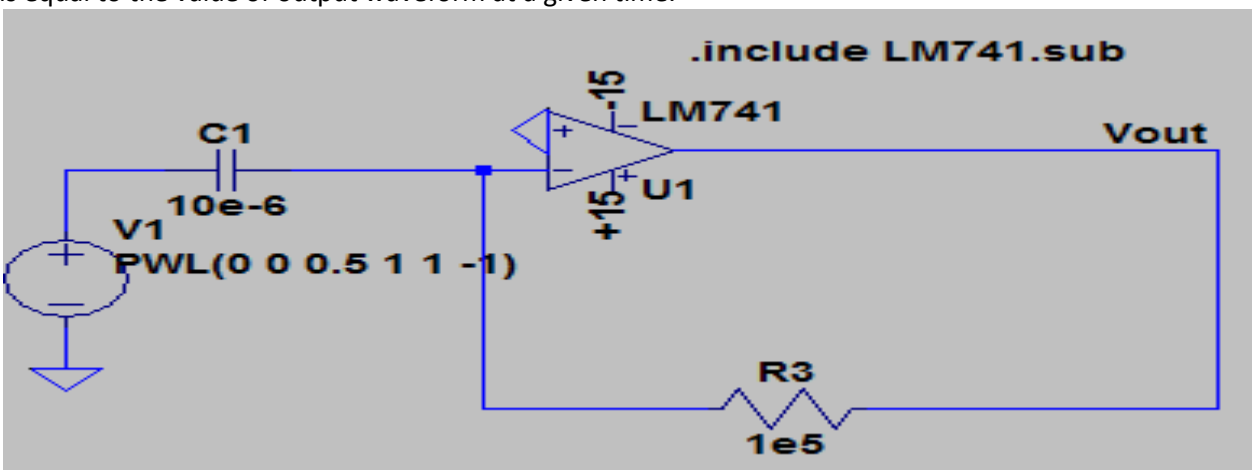

Figure 5

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