EE 205 Circuit Theory

Lab 7

Active Filter Analysis (LPF)

The aim of this lab is to analyze high order active filters in cascade. Simulate the results using Proteus.

Low Pass Filter (LPF):

Consider the example circuit given in Fig.1. We have already studied this circuit in the lecture. Here, we want to verify the calculated results with the Proteus simulations.

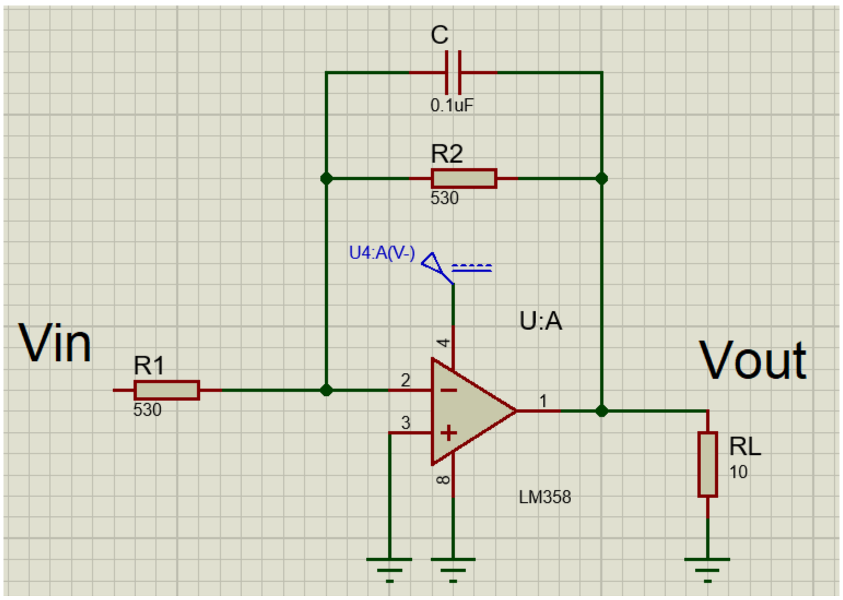

Fig.1. Active LPF (inverting amplifier form).

We can also build an active LPF using a non-inverting type of filter. This is shown in Fig.2.

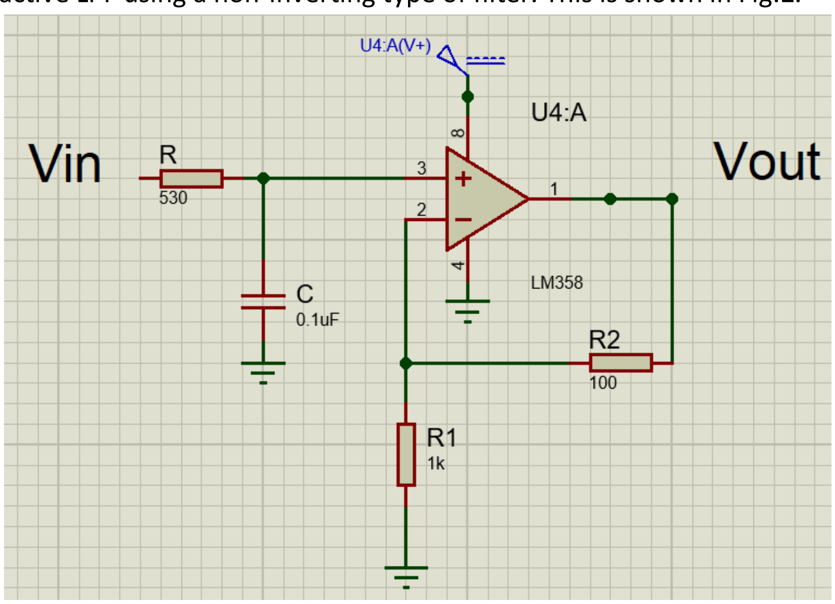

Fig.2. Active LPF (non-inverting amplifier form).

Suppose that the cut-off frequency $f_c = 3\ kHz$ is desired. Then, let $R = 530\ \Omega$ gives $C = 0.1\ uF$.

Procedure:

1. Implement the cascaded non-inverting filters as in Fig.3. in Proteus.
2. Connect a function generator at the input.
3. Connect oscilloscope at the output.
4. To represent the loud speaker, use 10 Ω resistor.
5. Run the simulation and observe the amplitudes of the output voltage signals at several different stages as the frequency changes.
6. Make comments below.

7. Connect a loud speaker and test the output. Make comments.

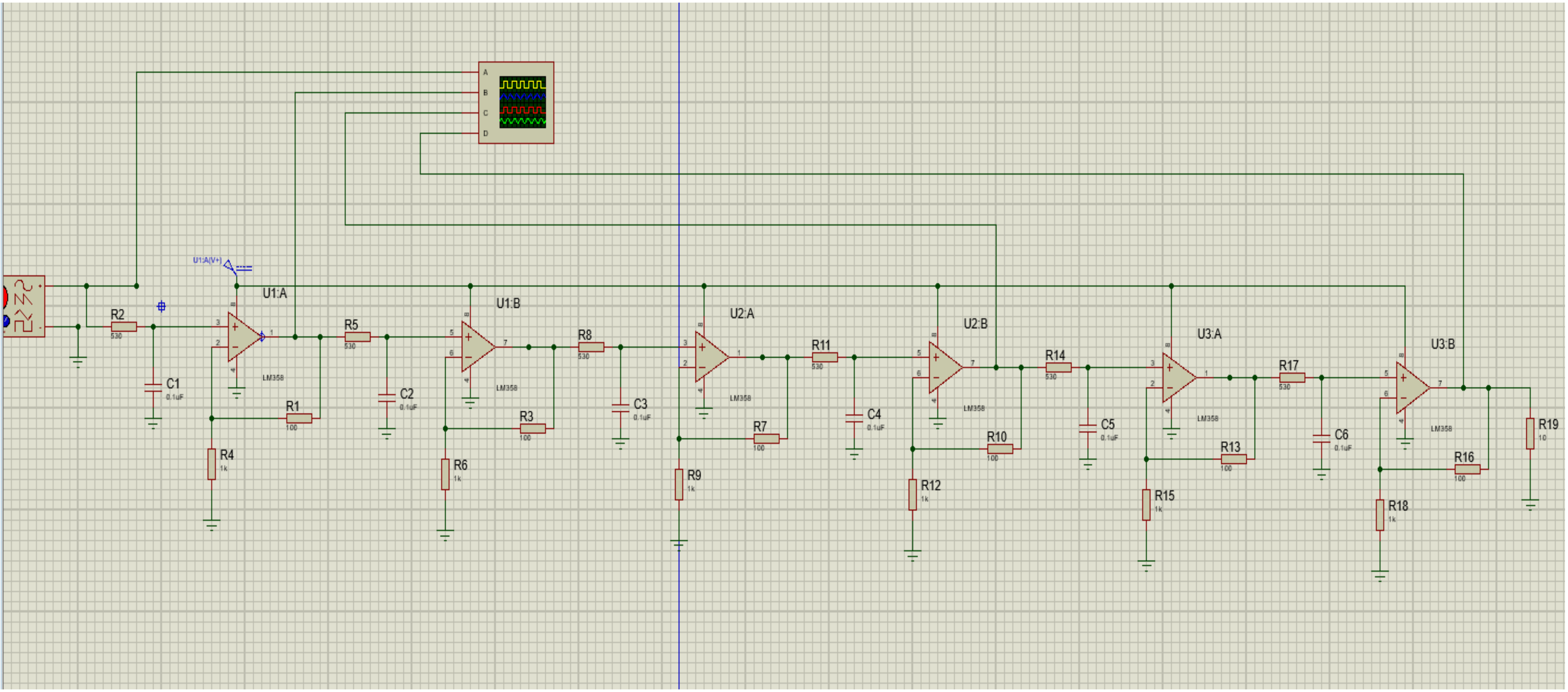

Fig.3. 6th order LPF at fc=3kHz (no scaling, approx.), R2,R5,R8,R11,R14,R17=530, All C=0.1uF. R1=R3=R7=R10=R13=R16=100. R4=R6=R9=R12=R15=R18=1k. R19=10 (loud speaker)