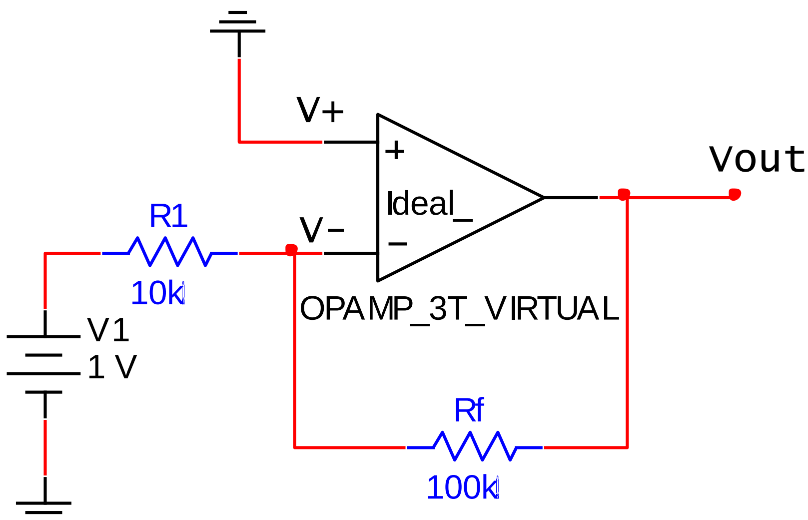
Component Level Laboratory

Analog Power Source Fundamentals (VCCS, CCVS,)

1. Inverting Op Amp Circuit:

For the circuit shown below, calculate the listed circuit parameters and the gain of the Op Amp circuit.



a. V_{R1}: ____________________

b. V_{RF}: ____________________

c. V_{+}: ____________________

d. V-: ____________________

e. I-: ____________________

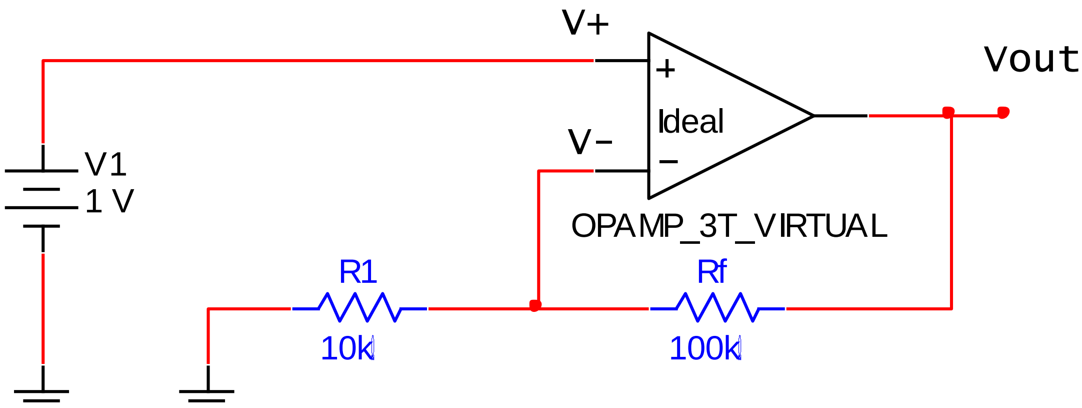
f. V_{out}: ____________________

g. I_{RF}: ____________________

h. Gain: ____________________

2. Non-Inverting Op Amp Circuit:

For the circuit shown below, calculate the listed circuit parameters and the gain of the Op Amp circuit



a. V_{R1}: ____________________

b. V_{RF}: ____________________

c. V_{+}: ____________________

d. V-: ____________________

e. I+: ____________________

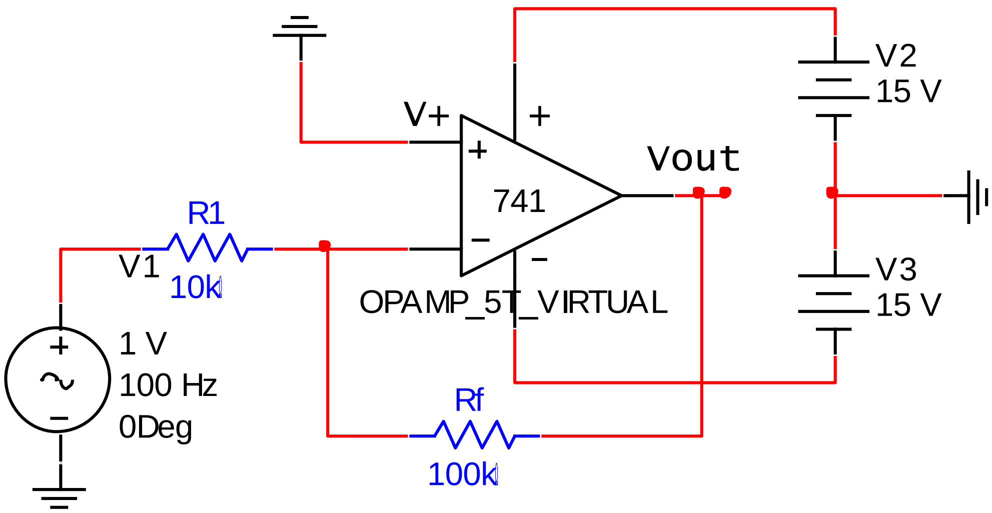
f. V_{out}: ____________________

g. I_{RF}: ____________________

h. Gain: ____________________

3. Voltage Controlled Voltage Source (VCVS) using Non-inverting Op Amp

For a non-inverting Op Amp circuits shown below (R1=10KΩ, R_f = 100KΩ), calculate the expected closed-loop voltage gain and the input impedance.



a. Close Loop Gain: ____________________ b. Z_{in}: ____________________

c. Vout: ____________________ d. V-: ____________________

(1) Apply an input voltage of 1 VDC to the circuit (as shown), calculate the voltage gain from the circuit (Vout/Vin): ___________________

(2) Apply a sinusoidal input voltage with 1V peak (f =100Hz) as input voltage, calculate the voltage gain of the circuit (Vout_peak/Vin_peak): ___________________; determine the phase relationship of the Vin and Vout: ___________________.

4. Voltage Controlled Current Source (VCIS)

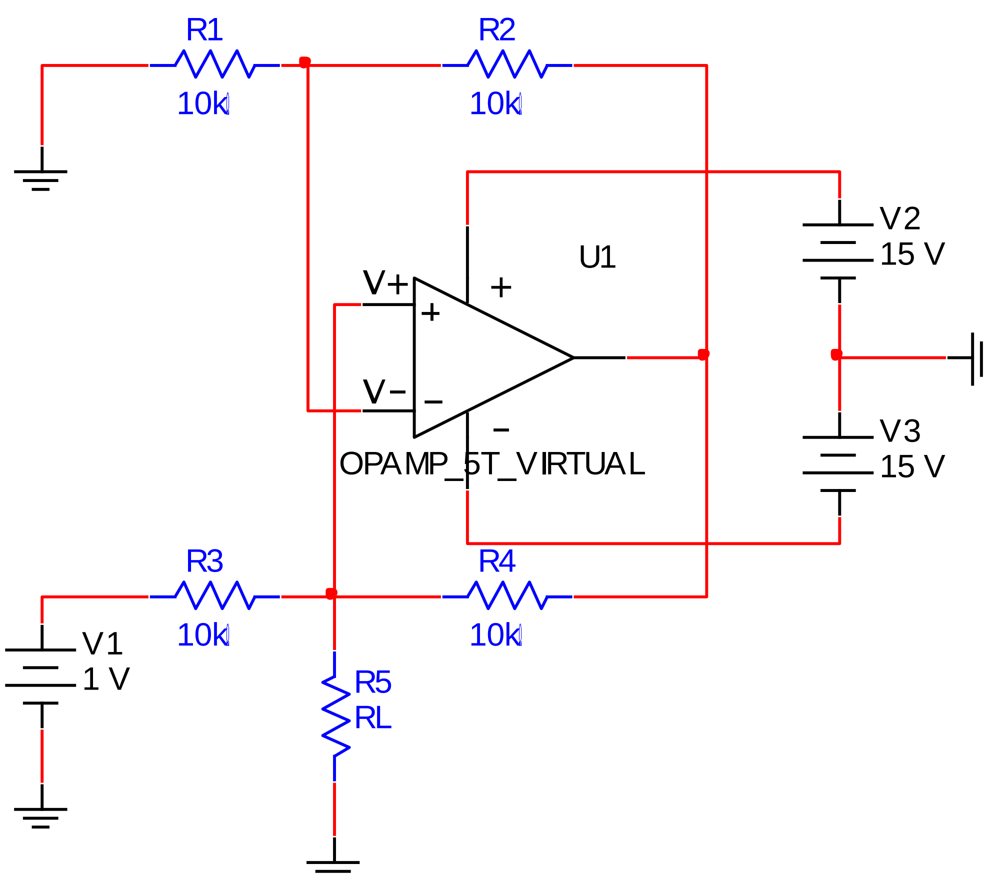
For the Op Amp circuit shown below, calculate the trans-conductance, the current through RL, the minimum and maximum resistance value of RL for proper operation of the circuit:

a. g_m: ____________________

b. I_{RL}: ____________________

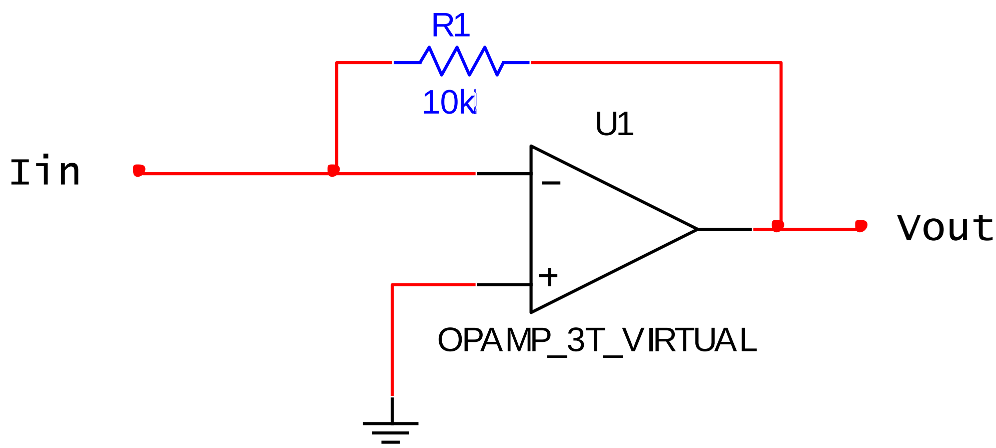
c. RL_{min}: ____________________

d. RL_{max}: ____________________



5. Current Controlled Voltage Source (ICVS)

For the ICVS using Op Amp circuit shown below, calculate the trans-resistance of the circuit, the output voltage V_{out} when I_{in} = 0.1 mA



a. R_m: ___________________

b. Vout: _________________

Reminder: Bring your breadboard to the lab!