BME 212 Electronics Laboratory

Experiment #7 OPAMP Characteristics and Basic OPAMP Circuits

Objective

The objective of this experiment is understanding opamp characteristics and applications of inverting, non-inverting and unity-follower circuits.

Preliminary Work

1-) Derive the output voltage expression given in background information of the the inverting, non-inverting and unity-follower circuits.

2-) Design an amplifier using an inverting and a non-inverting circuit with Voltage Gain (A_{CL}) = -100 (10x-10). Then, draw your final circuit diagram. To implement the circuit, design it using close nominal resistor values from your component list.

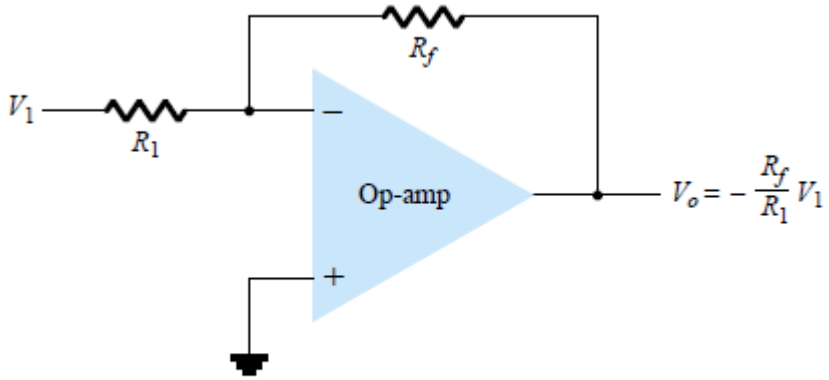
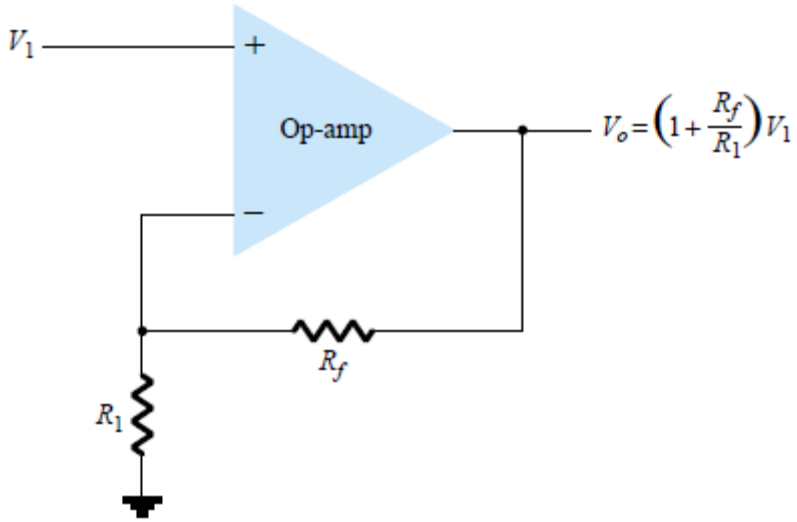


Figure 14.15 Inverting constant-gain multiplier.



(a)

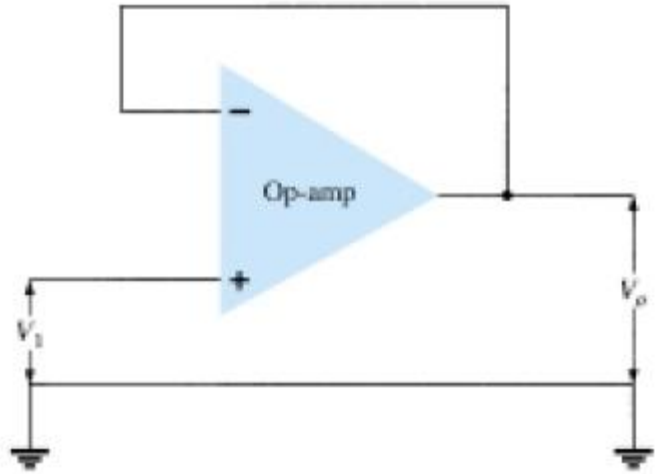


Figure 14.16 Noninverting constant-gain multiplier.

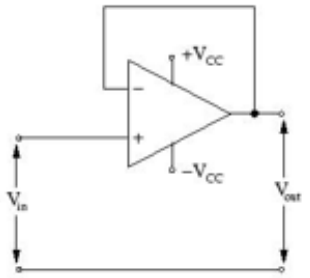
Procedure

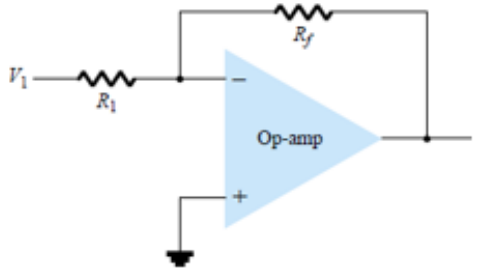
1) Set up the circuits a, b, and c given below. For all circuits observe $v_{in}(t)$ and $v_o(t)$ then draw into the graph paper and calculate closed-loop gains (A_{CL}) . Also for circuit b plot the Vout vs. Vin using the X-Y plot function on the oscilloscope and draw the graph into the result paper.

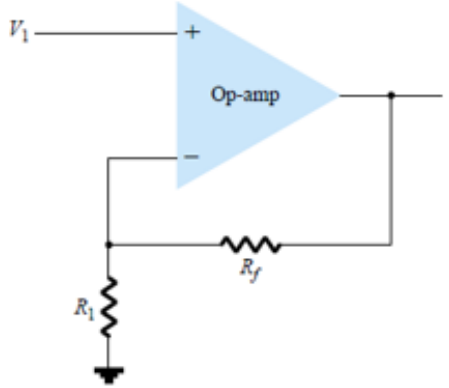
a) $v_{in}(t)$ = 2 sin(2000πt) V
Vcc = +-15V

b) $v_{in}(t)$=0.1sin(2000πt) V
Vcc = +-15V
R_1 = 1kΩ, R_f = 100kΩ

c) $v_{in}(t)$ = 1 sin(2000πt) V
Vcc = +-15V
R_1 = 1kΩ, R_f = 2.2kΩ







Procedure (Cont.)

2) Set up your circuit designed in Preliminary Work 2. For 10 mV_{pp} sinusoidal input voltage plot the output voltage of the circuit, calculate the A_{CL} and compare with Preliminary Work 2.

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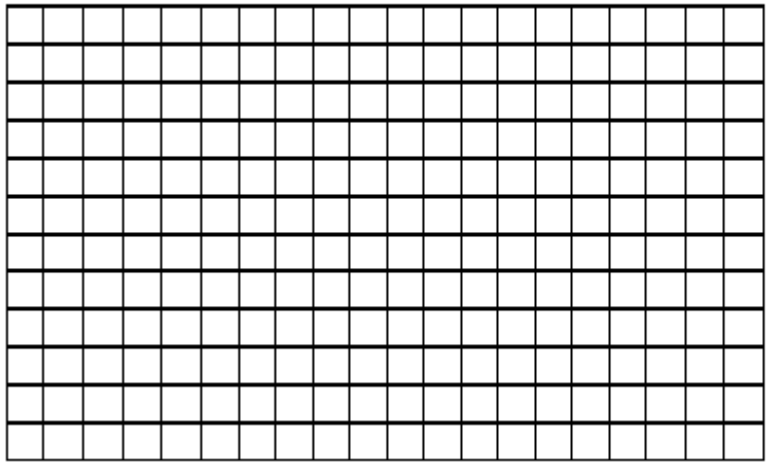
Results

1) Draw input vs. output voltages

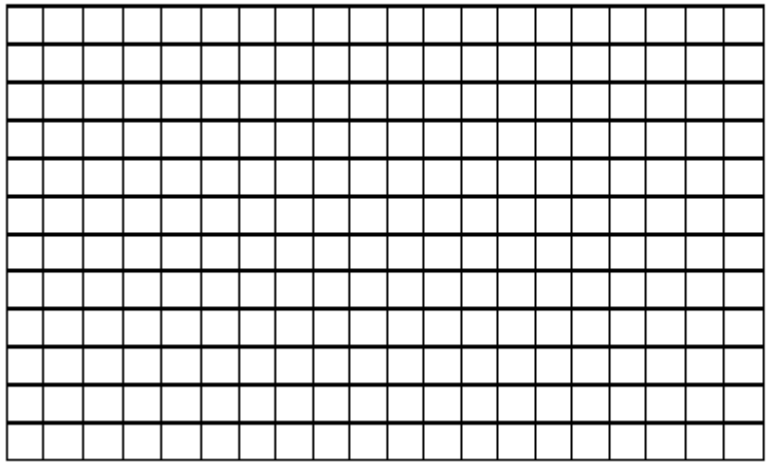
A.



ACL	

Comment:

B.



ACL	

Comment:

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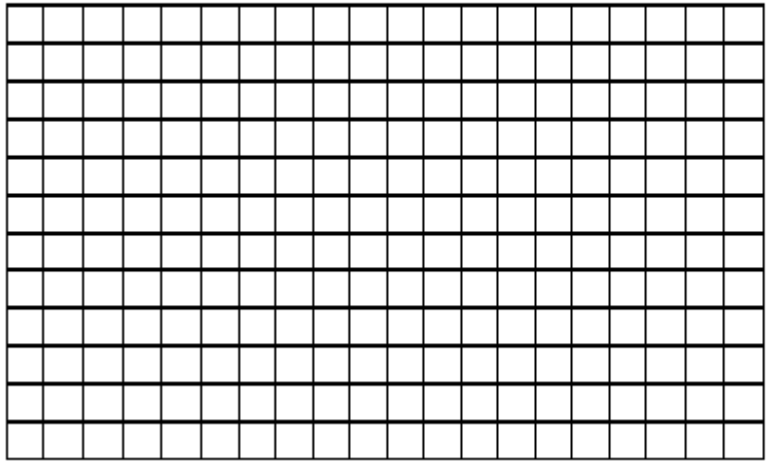
Results (Cont.)

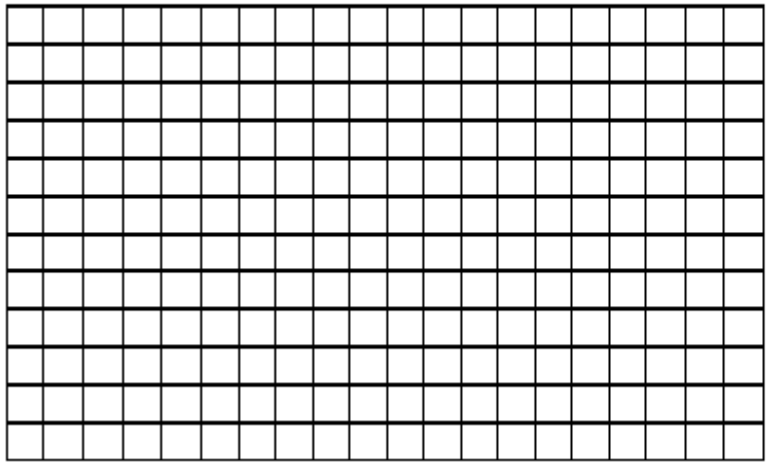
C.



A_{CL}	

Comment:

2) Draw input vs. output voltages



A_{CL} (Theoretical)	
A_{CL} (Practical)	

Comment: