23S-EC ENGR-3-LEC-1 Homework 8

SANJIT SARDA

TOTAL POINTS

100 / 100

QUESTION 1

1 Q1 : Expression for V0 100 / 100

✓ **- 0 pts** *Correct*

- 10 pts Almost correct

- 25 pts Partially Incorrect

- 40 pts Mostly Incorrect

- 100 pts Incorrect

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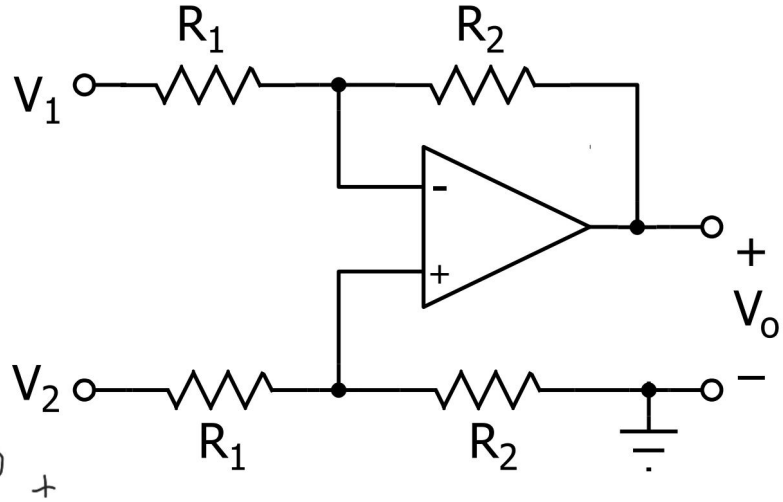
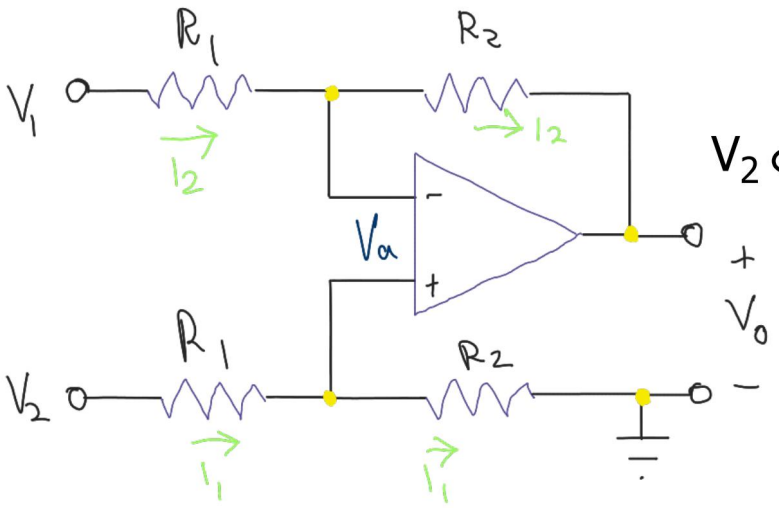
EE3 Spring 2023
Homework Problem 8

Find $V_o = f(V_1, V_2, R_1, R_2)$.
Remember the Summing Point Constraints and KCL equations!





Differential Amplifier.

@ V_- $\quad \frac{V_a - V_1}{R_1} + \frac{V_a - V_o}{R_2} = 0$

@ V_+ $\quad \frac{V_a - V_2}{R_1} + \frac{V_a}{R_2} = 0$

Solving:

$$V_a\left(\frac{R_1+R_2}{R_1R_2}\right) = \frac{V_2}{R_1}$$

$$\therefore V_a = V_2\left(\frac{R_2}{R_1+R_2}\right)$$

$$V_a\left(\frac{R_1+R_2}{R_1R_2}\right) - \frac{V_1}{R_1} - \frac{V_o}{R_2} = 0$$

$$\therefore \frac{V_o}{R_2} = V_2\left(\frac{R_2}{R_1+R_2}\right)\left(\frac{R_1+R_2}{R_1R_2}\right) - \frac{V_1}{R_1}$$

$$\therefore \frac{V_o}{R_2} = \frac{1}{R_1}(V_2 - V_1) \qquad \therefore V_o = \frac{R_2}{R_1}(V_2 - V_1)$$

1 Q1 : Expression for V0 100 / 100

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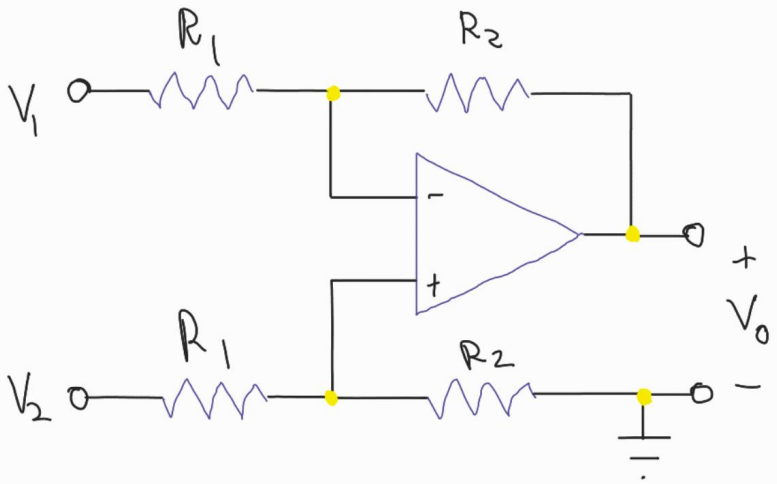
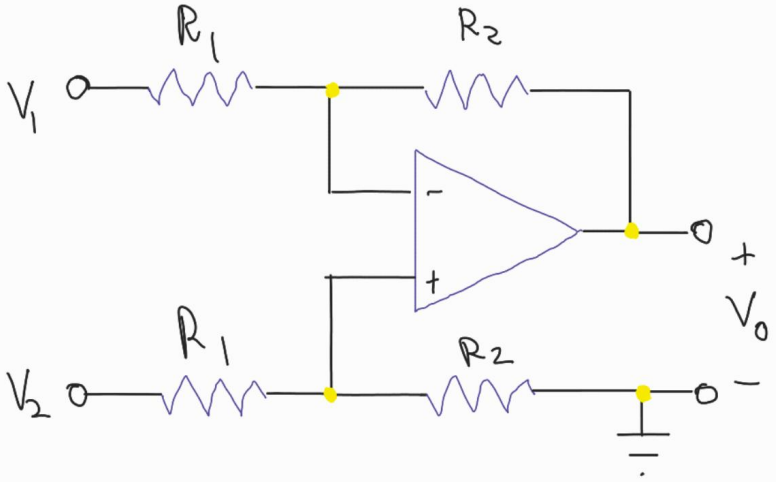

R1
R2
V1
-
+
+
V0
R1
R2
V2
-


R1
R2
V1
-
+
+
V0
R1
R2
V2
-