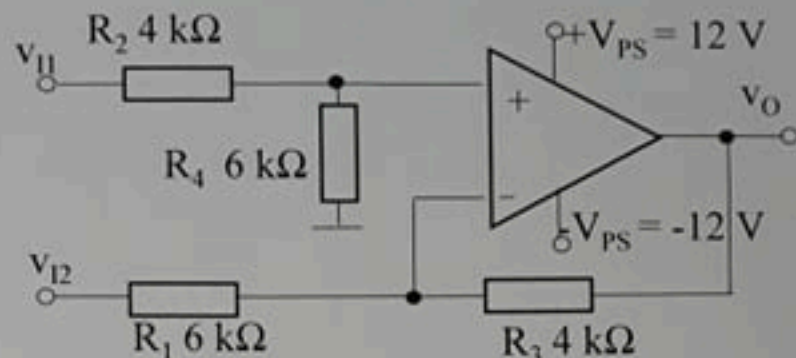


H7 – Differential amplifier with OpAmp

Homework 7 – Differential amplifier with OpAmp



- What is the application of the circuit?
- What is the expression $v_O(v_{I1}, v_{I2})$?
- What is the input resistance seen by v_{I1} ?
- Compute and plot $v_O(t)$ if $v_{I1}(t) = 5\sin\omega t$ [V]
 $v_{I2}(t) = 6\sin\omega t$ [V]
- Resize the resistors so that: $v_O = 2(v_{I1} - v_{I2})$

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a) Differential amplifier

$$b) v^+ = v; \quad v^- = \frac{R_4}{R_2 + R_4} \cdot v_{I1} = \frac{3}{5} v_{I1}; \quad v^- = \frac{R_3 v_{I2} + R_1 v_O}{R_1 + R_3} = \frac{4v_{I2} + 6v_O}{10}$$

$$= \frac{2v_{I2} + 3v_O}{5}$$

$$\rightarrow \frac{3}{5} v_{I1} - \frac{2}{5} v_{I2} = \frac{3}{5} v_O \Rightarrow v_O = v_{I1} - \frac{2}{3} v_{I2}$$

$$c) R_{ii} = R_2 + R_4 = 10 \text{ k}\Omega$$

$$d) v_O = 5 \sin \omega t$$

$$e) R_4 = 2R_2$$

$$R_3 = 2R_1$$