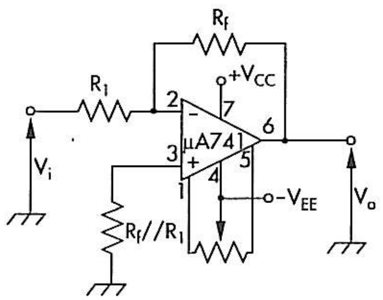
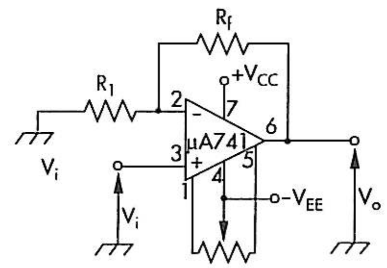
CONNESSIONE INVERTENTE



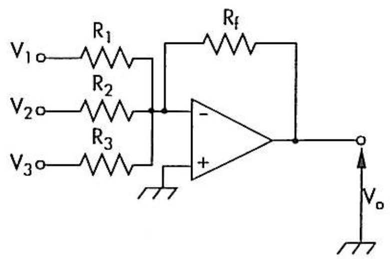
$$V_o = -\frac{R_f}{R_1} \cdot V_i$$

CONNESSIONE NON INVERTENTE



$$V_o = \left(1 + \frac{R_f}{R_1}\right) \cdot V_i$$

SOMMATORE INVERTENTE

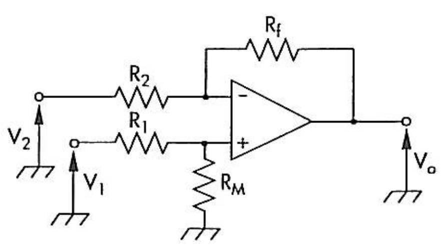


$$V_o = -\left(\frac{R_f}{R_1} \cdot V_1 + \frac{R_f}{R_2} \cdot V_2 + \frac{R_f}{R_3} \cdot V_3\right)$$

Se $R_1 = R_2 = R_3 = R$

$$V_o = -\frac{R_f}{R}\left(V_1 + V_2 + V_3\right)$$

DIFFERENZIALE



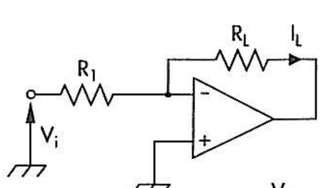
$$V_o = \left[\left(1 + \frac{R_f}{R_2}\right) \cdot \left(\frac{R_M}{R_M + R_1}\right)\right] \cdot V_1 - \frac{R_f}{R_2} \cdot V_2$$

Se $\frac{R_f}{R_2} = \frac{R_M}{R_1} = A$

$$V_o = A \cdot (V_1 - V_2)$$

CONVERTITORE V-I

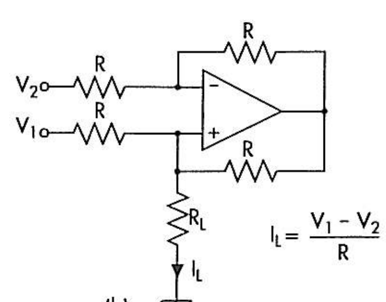
Con carico isolato da massa



$$I_L = \frac{V_i}{R_1}$$

(a)

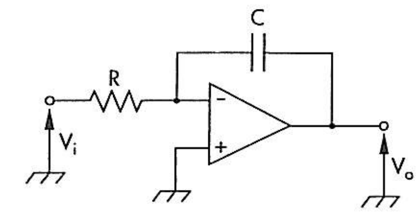
Con carico collegato a massa



$$I_L = \frac{V_1 - V_2}{R}$$

(b)

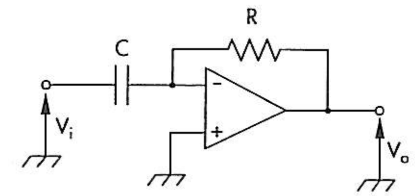
INTEGRATORE INVERTENTE



Risposta nel tempo: $V_o(t) = V_o(0) - \frac{1}{R \cdot C}\int_0^t V_i \cdot dt$

Risposta in frequenza: $\overline{V_o}(J\omega) = \frac{1}{J\omega RC} \cdot \overline{V_i}(J\omega)$

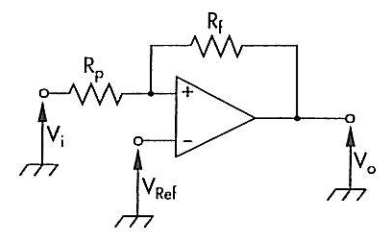
DERIVATORE INVERTENTE

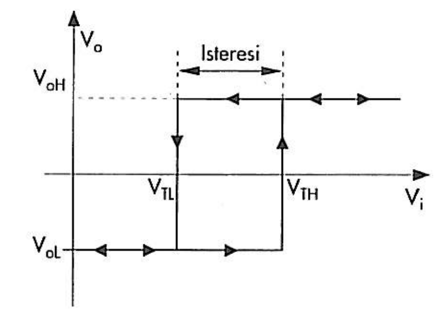


Risposta nel tempo: $V_o(t) = -R \cdot C \cdot \frac{dV_i}{dt}$

Risposta in frequenza: $\overline{V_o}(J\omega) = -J\omega RC \cdot \overline{V_i}(J\omega)$

COMPARATORE NON INVERTENTE CON ISTERESI

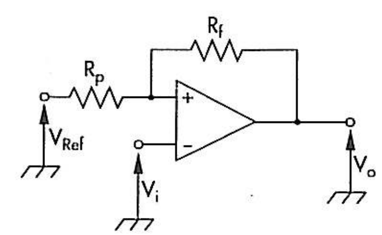


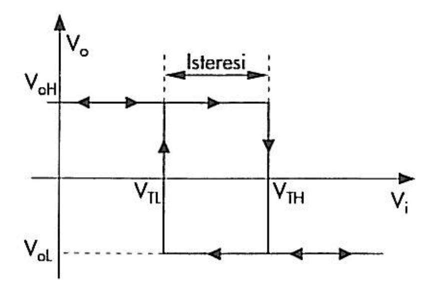


$$V_{TH} = \frac{R_f + R_p}{R_f} \cdot V_{Ref} - \frac{R_p}{R_f} \cdot V_{oL}$$

$$V_{TL} = \frac{R_f + R_p}{R_f} \cdot V_{Ref} - \frac{R_p}{R_f} \cdot V_{oH}$$

COMPARATORE INVERTENTE CON ISTERESI

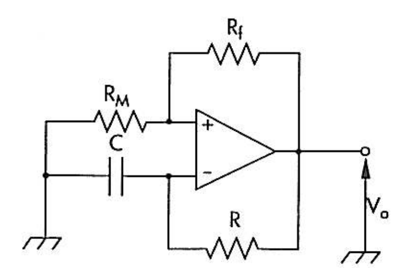


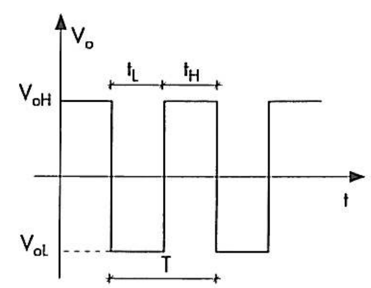


$$V_{TH} = \frac{R_f}{R_f + R_p} \cdot V_{Ref} + \frac{R_p}{R_f + R_p} \cdot V_{oH}$$

$$V_{TL} = \frac{R_f}{R_f + R_p} \cdot V_{Ref} + \frac{R_p}{R_f + R_p} \cdot V_{oL}$$

MULTIVIBRATORE ASTABILE





$$t_H = t_L = R \cdot C \cdot \ln\left(1 + 2\frac{R_M}{R_f}\right)$$

$$f = \frac{1}{t_H + t_L} = \frac{1}{2 \cdot R \cdot C \ln\left(1 + \frac{2 \cdot R_M}{R_f}\right)}$$