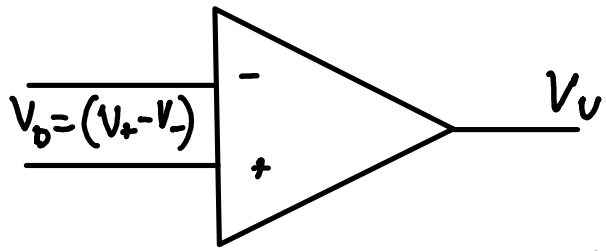
Amplificatori Operazionali

Tuesday, January 14, 2025 12:55 PM

Gli amplificatori operazionali, detti OPA (Operation Amplifiers)



Il + e' chiamato **ingresso NON invretente**
Il - e' chiamato **ingresso invertente**

Idealmente

$R_{in} = \infty$

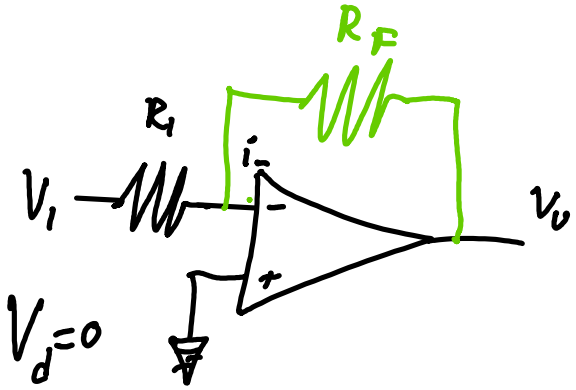
$R_{out} = \emptyset$

$$\frac{V_u}{V_d} = A = \infty$$

V_d ↘ minuscola $\cong 0$

$V_d = 0 \Rightarrow V_+$

Configurazione invertente



Resistenza di Feedback

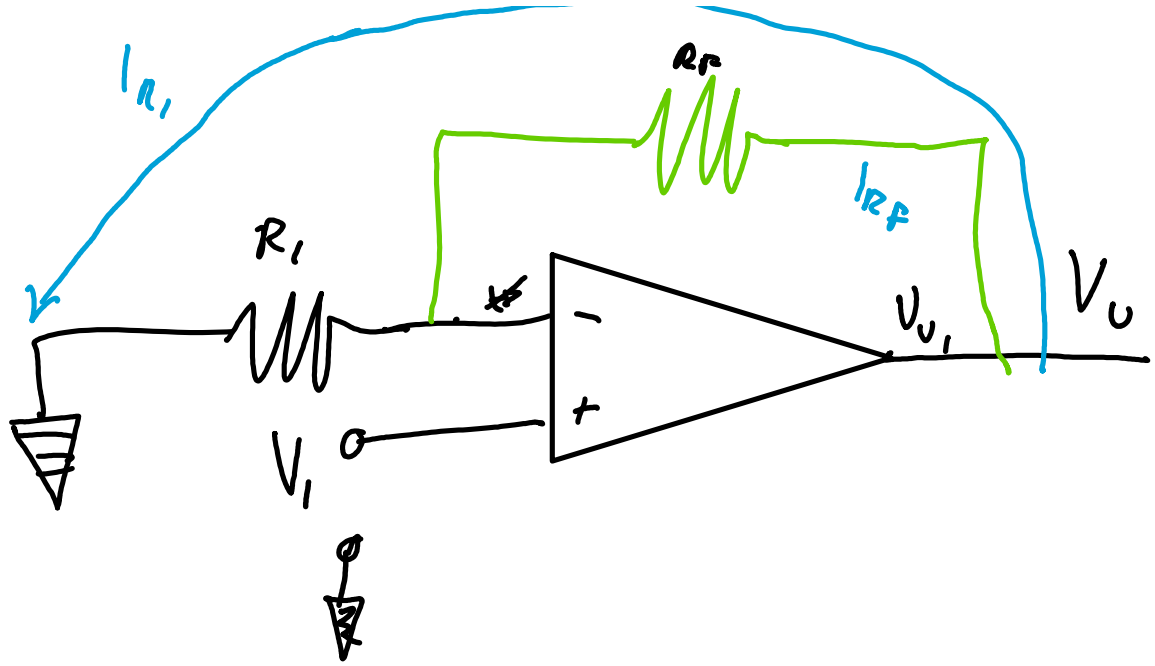
$$A = \frac{V_u}{V_1}$$

$$V_I = V_{R_1} + V_d = R_1 I_+ + V_d \quad (V_d \to 0)$$

$$V_u = V_d - V_{R_F}$$

$$\frac{V_1}{V_u} = -\frac{V_u}{R_F} \Rightarrow \frac{V_u}{V_1} = -\frac{R_F}{R_1}$$

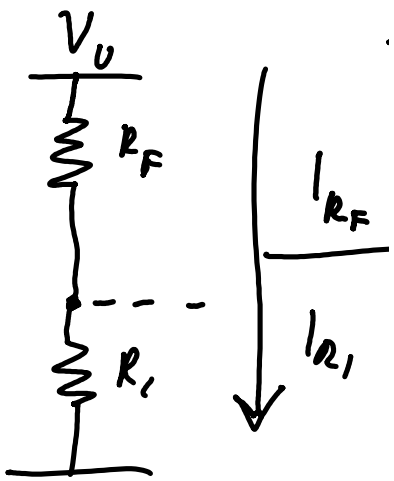
Configurazione non Invertente



$$I_{R_F} = I_1$$

$$I_{R_F} = \frac{(V_U - V_1)}{R}$$

$$I_{R_1} = \frac{V_1}{R_1}$$



$$1 \quad \frac{I_{R_F}}{I_{R_1}} = \frac{(V_0 - V_1) \cdot R_F}{V_1 R_1}$$

$$\frac{(V_0 - V_1) \cdot R_F}{V_1 R_1} = 1$$

$$\frac{V_1}{R_1} = \frac{V_0 - V_1}{R_F}$$

$$\frac{V_1}{R_1} = \frac{V_U}{R_F} - \frac{V_1}{R_F}$$

$$\frac{V_1}{R_1} + \frac{V_1}{R_F} = \frac{V_U}{R_F}$$

$$V_1\left(\frac{1}{R_1} + \frac{1}{R_F}\right) = \frac{V_U}{R_F}$$

$$V_U = V_1\left(\frac{1}{R_1} + \frac{1}{R_F}\right) R_F$$

$$V_U = V_1\left(1 + \frac{R_F}{R_1}\right)$$