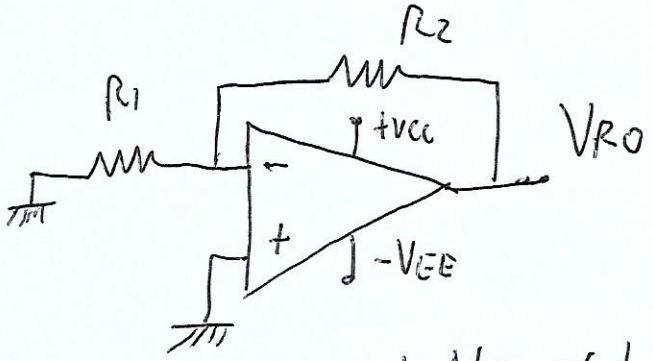
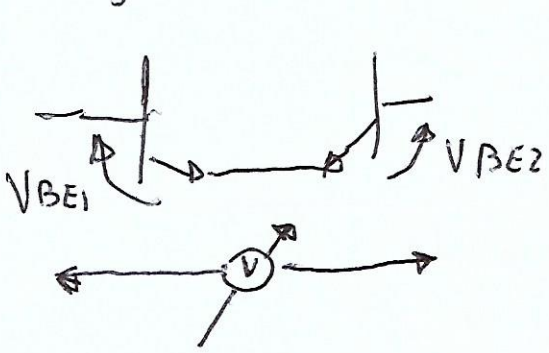
Errores de offset (desajuste)

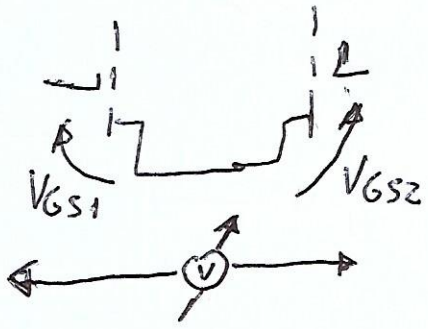


ideal $V_{RO} = \phi$ real $V_{RO} \neq \phi$

2 Causas

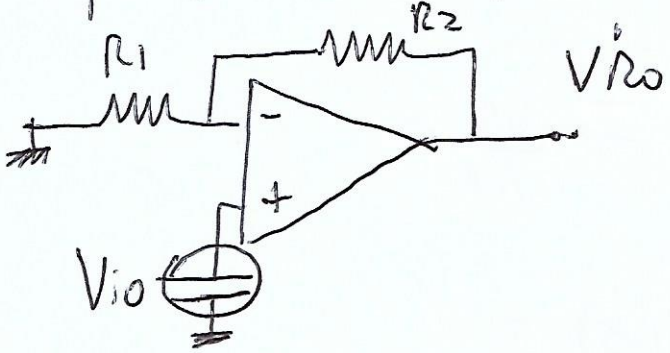
a) Desajuste de potenciales en la entrada del diferencial





En las hojas de datos V_{io}

Se puede poner de manifiesto con un A.O ideal

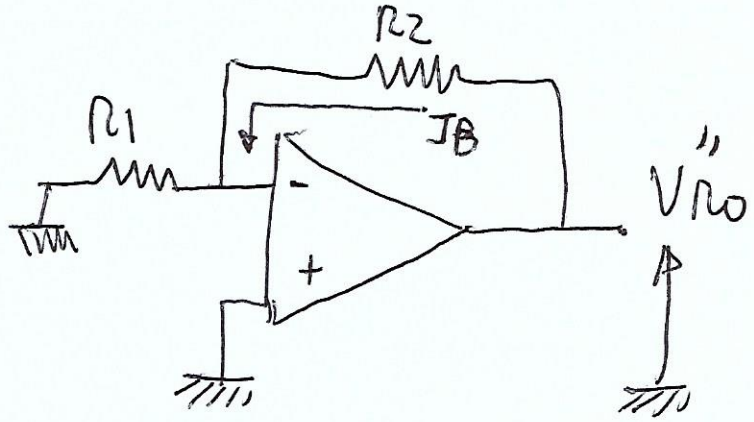


$$\therefore \quad V'_{RO} = V_{io}\left(1 + \frac{R_2}{R_1}\right)$$

Φ

$\pm$

b) Cossiente de polarización (bipolar) o de entrada (MOS)



$V''_{ro} = I_B R_2$ en bipolar

$V''_{ro} = I_i R_2$ en FET

$\therefore$

$$V_{ro} = V'_{ro} + V''_{ro}$$

$\pm$ signado

Peor caso $V_{ro_{MAX}} = V'_{ro_{MAX}} + V''_{ro_{MAX}}$

ambos signados

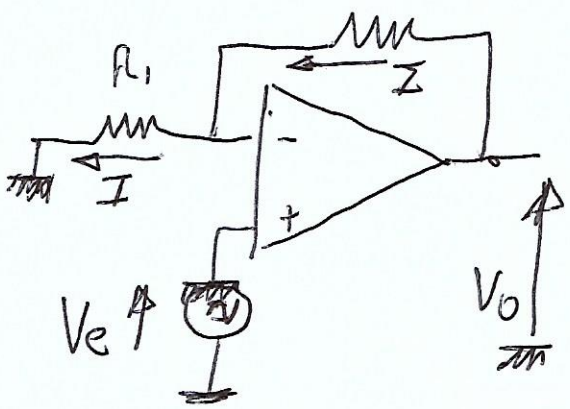
$$V_{ro_{MAX}} = V_{io_{MAX}} \left(1 + \frac{R_2}{R_1}\right) + I_{B_{MAX}} R_2$$

o' $I_{i\,MAX}$ en unipolar

Como impacta el valor de R_2

Si: $R_2 \uparrow\uparrow$ $V''_{R0} \uparrow\uparrow$

Si: $R_2 \downarrow\downarrow$ R_2 por ejemplo con $R_2 = 9R_1$



$A_{pt} = 10$

Si: $V_e = 1\hat{V}$

$\therefore V_o = 10\hat{V}$

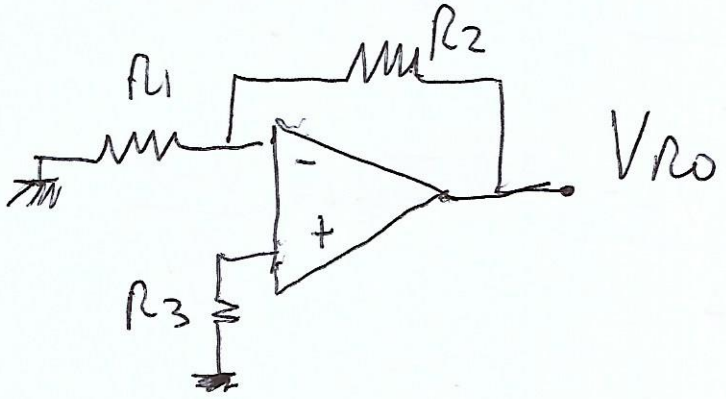
$I = \frac{V_o}{R_1 + R_2}$ Si: $R_1 = 1$ $R_2 = 9\Omega$

$I = 1A$

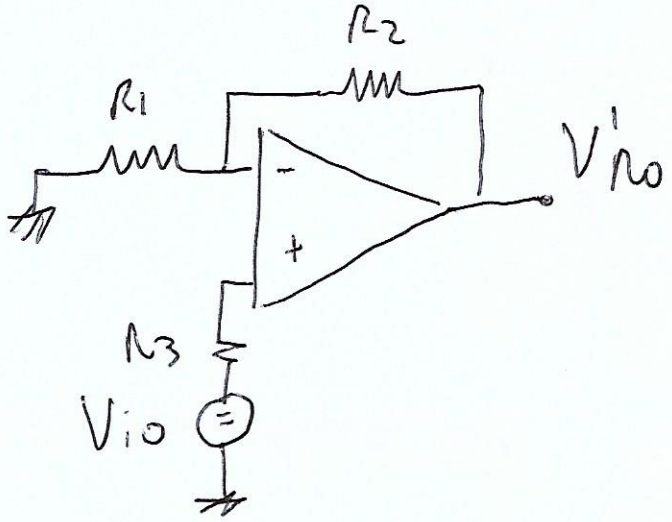
no dispongo de esa corriente de salida

Si: $R_1 = 1K$ $R_2 = 9K$ $I = 1mA$

Como disminuir el offset

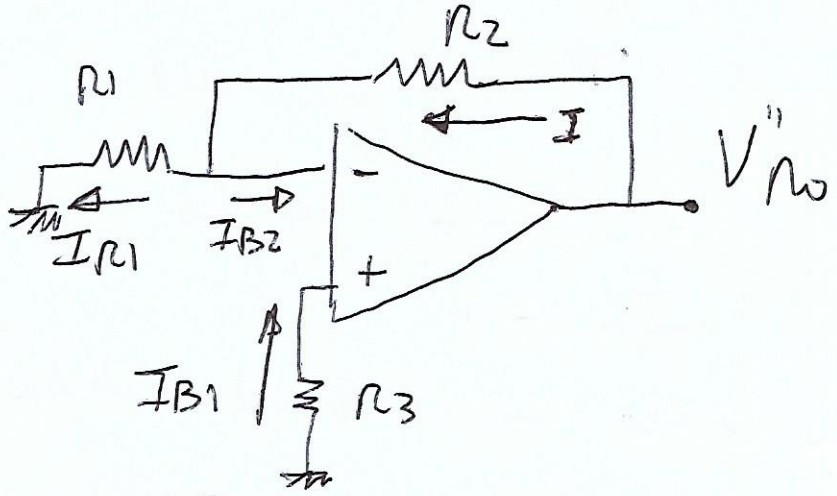


a)



$$V'_{R0} = V_{io}\left(1+\frac{R_2}{R_1}\right)$$

b)



$$V_{+T} = -I_{B1} R_3 \qquad I = I_{R1} + I_{B2}$$

$$I = \frac{V''_{R0} - V_{-T}}{R_2} \qquad V_{-T} = V_{+T}$$

$$I = \frac{V''_{R0} - V_{+T}}{R_2} \qquad I_{R1} = \frac{V_{-T}}{R_1}$$

$$I = \frac{V''_{no}}{R_2} - \frac{V_{+T}}{R_2}$$

$$\frac{V''_{no}}{R_2} = I + \frac{V_{+T}}{R_2}$$

$$\frac{V''_{no}}{R_2} = I_{R1} + I_{B2} - \frac{I_{B1} R_3}{R_2}$$

$$\frac{V''_{no}}{R_2} = I_{B2} - I_{B1}\frac{R_3}{R_2} - I_{B1}\frac{R_3}{R_1}$$

$$\frac{V''_{no}}{R_2} = I_{B2} - I_{B1}\left(\frac{R_3}{R_2} + \frac{R_3}{R_1}\right)$$

$\wedge$ $R_3 = R_1 \| R_2$ $\quad R_3 = \frac{R_1 \cdot R_2}{R_1 + R_2}$

$$\frac{V''_{no}}{R_2} = I_{B2} - I_{B1}\left(\frac{R_1 \cdot R_2}{R_2(R_1+R_2)} + \frac{R_1 \cdot R_2}{R_1(R_1+R_2)}\right)$$

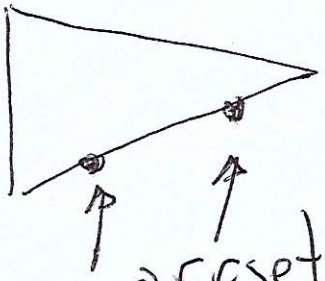
Δ

$$\therefore V''_{no} = R_2\underbrace{\left(I_{B2} - I_{B1}\right)}_{I_{io}}$$

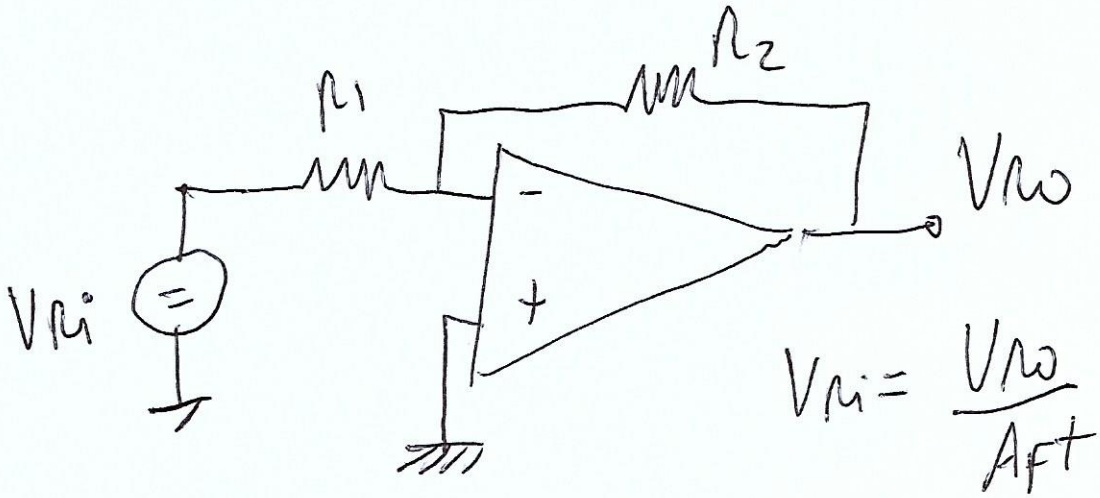
$$V_{RO} = \pm \left(V_{io}\left(1+\frac{R_2}{R_1}\right) + I_{io} R_2 \right)$$

V_{RO} max con parámetros máximos

Como corregir el offset



offset null



$$V_{Ri} = \frac{V_{RO}}{A_{FT}}$$

$V_{Ri} \leq V_{iadj}$