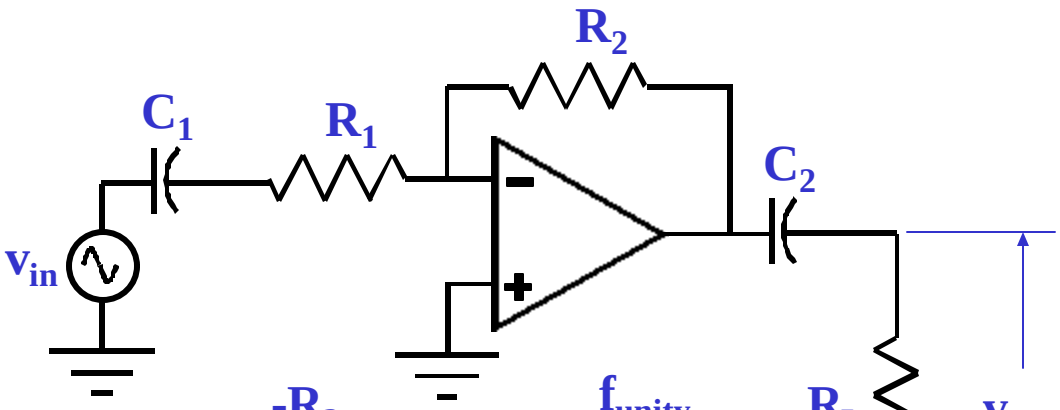
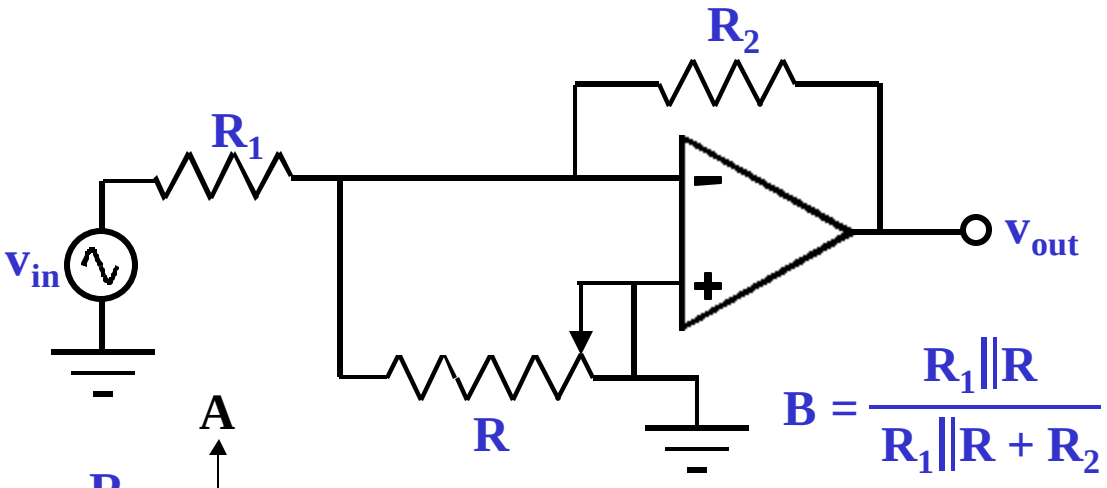
Amplificador inversor acoplado en c.a.



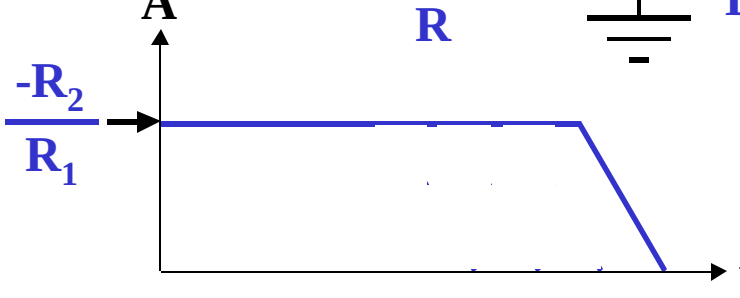
$$A_V = \frac{-R_2}{R_1} \qquad f_2 = \frac{f_{unity}}{\frac{R_2}{R_1} + 1}$$

$$f_{c1} = \frac{1}{2\pi R_1 C_1} \qquad f_{c2} = \frac{1}{2\pi R_L C_2}$$

Ancho de banda ajustable

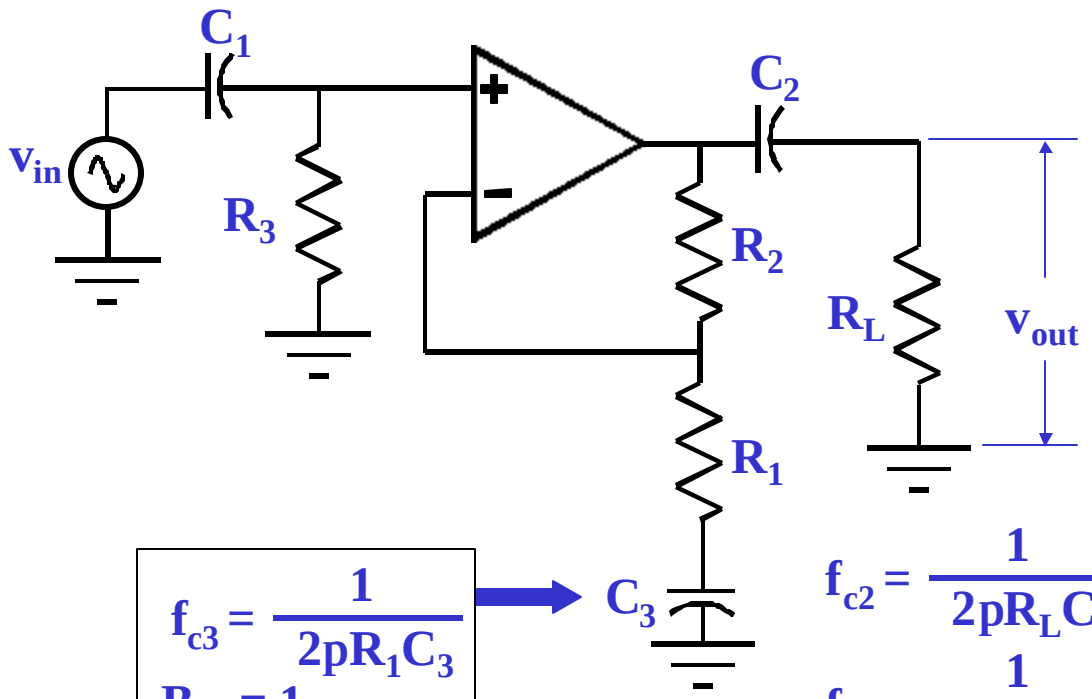


$$B = \frac{R_1 \| R}{R_1 \| R + R_2}$$



$$f_2 = Bf_{unity}$$

Amplificador no inversor acoplado en c.a.



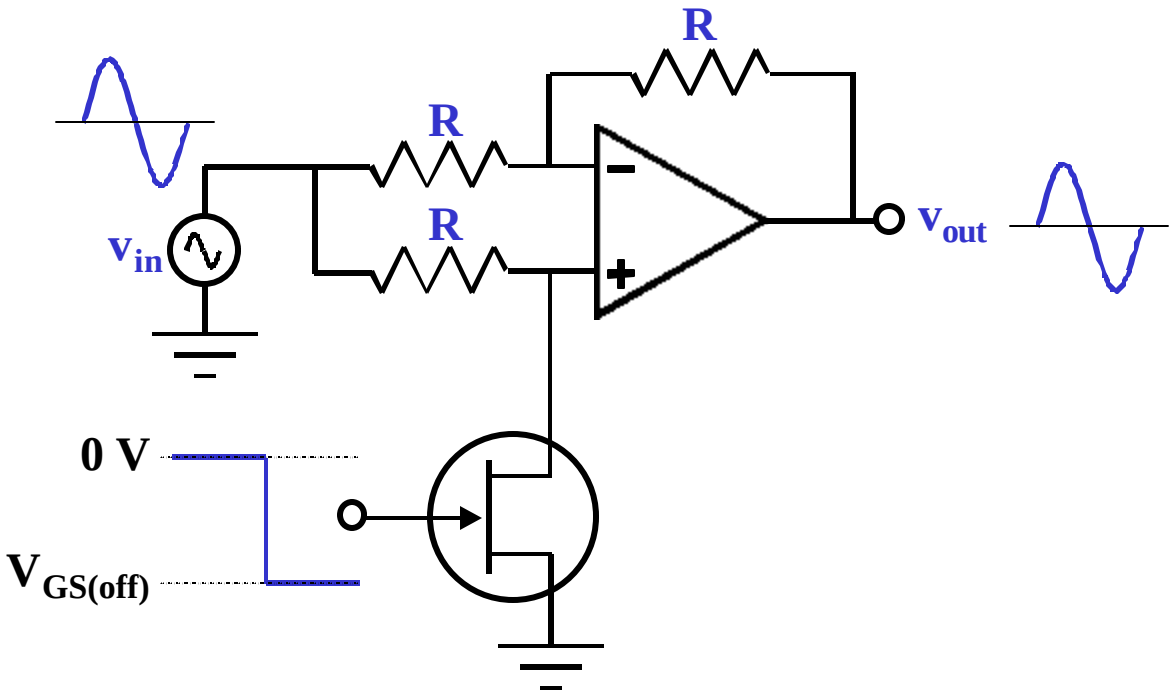
$$f_{c3} = \frac{1}{2\pi R_1 C_3}$$

$$B_{dc} = 1$$

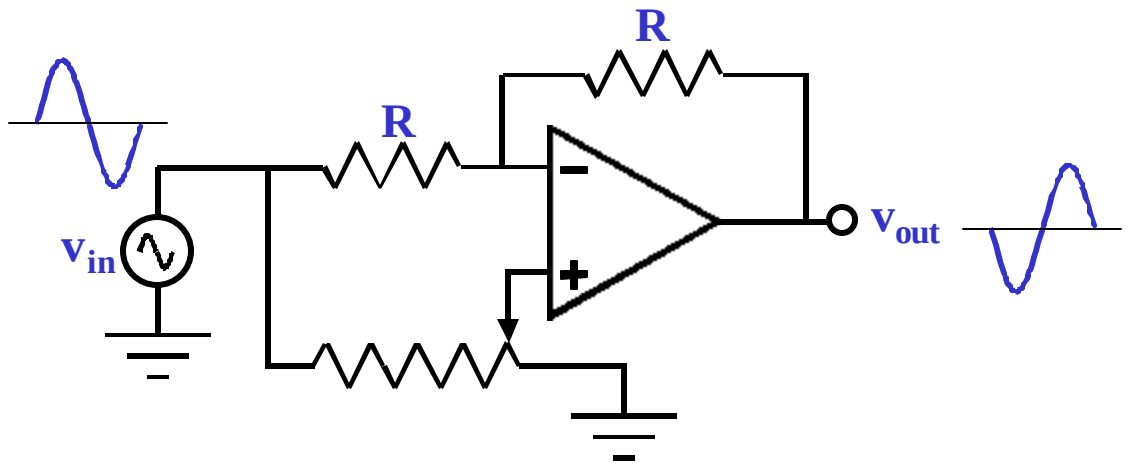
$$f_{c2} = \frac{1}{2\pi R_L C_2}$$

$$f_{c1} = \frac{1}{2\pi R_3 C_1}$$

Inversor / No – inversor controlado con JFET

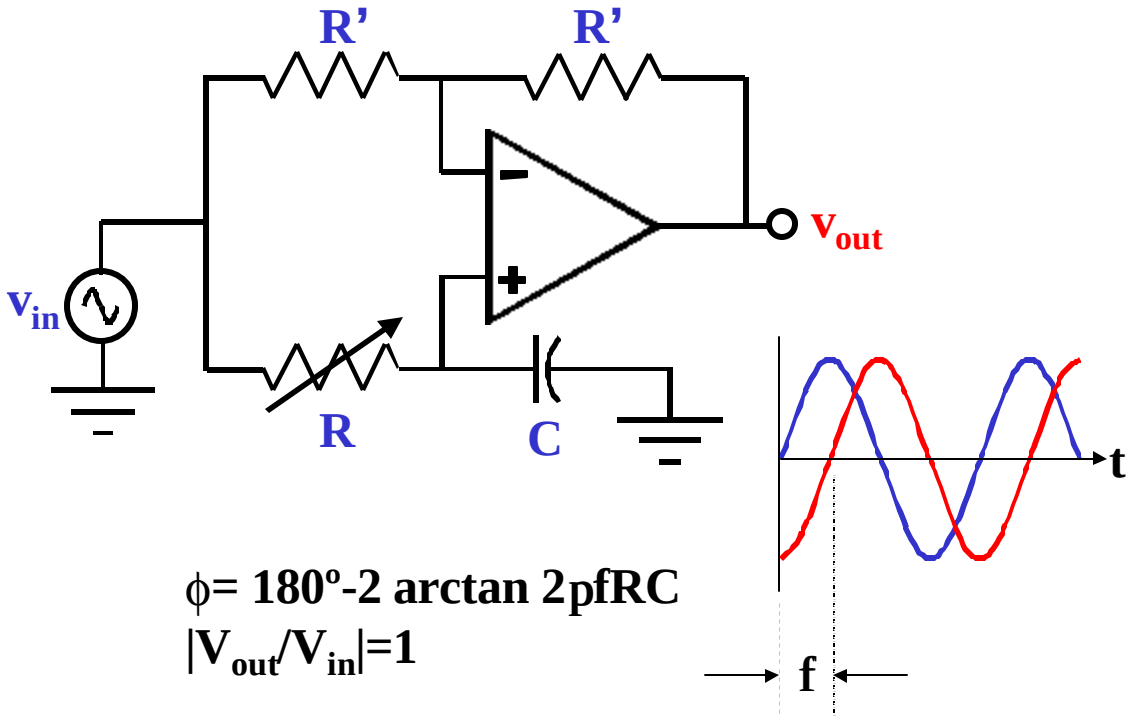


Ganancia ajustable entre ± 1



- Pot. extremo izquierdo A_V=-1
- Pot. extremo derecho $A_V=A_{non}+A_{inv}=1$

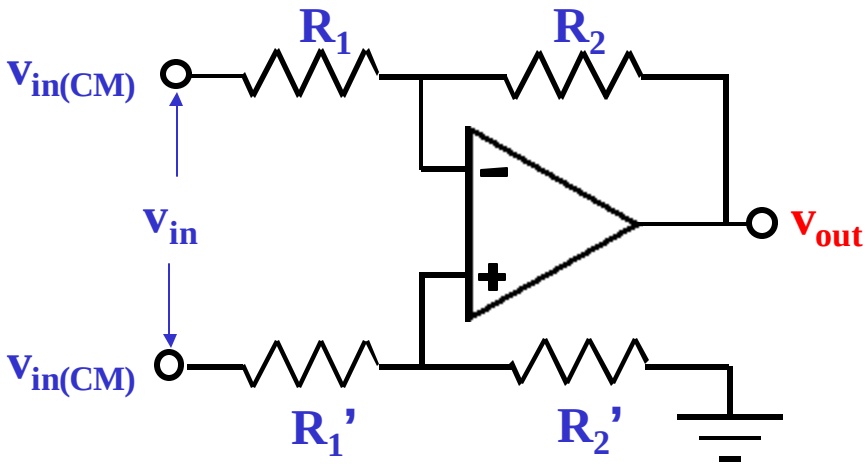
Phase shifter



ϕ= 180º-2 arctan 2pfRC

$|V_{out}/V_{in}|=1$

Amplificador Diferencial



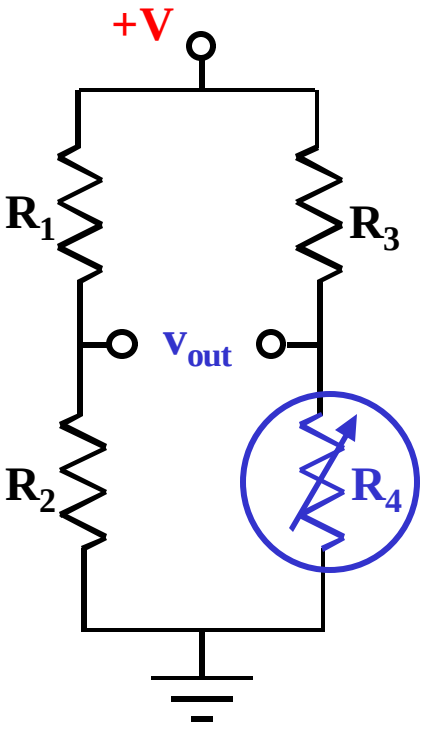
La relación CMRR depende de la igualdad de las resistencias

$$A_V = \frac{-R_2}{R_1}$$

$$\pm 2\frac{DR}{R} < A_{CM} < \pm 4\frac{DR}{R}$$

$$Z_{in} = 2R_1$$

Puente de Wheatstone



Puente equilibrado

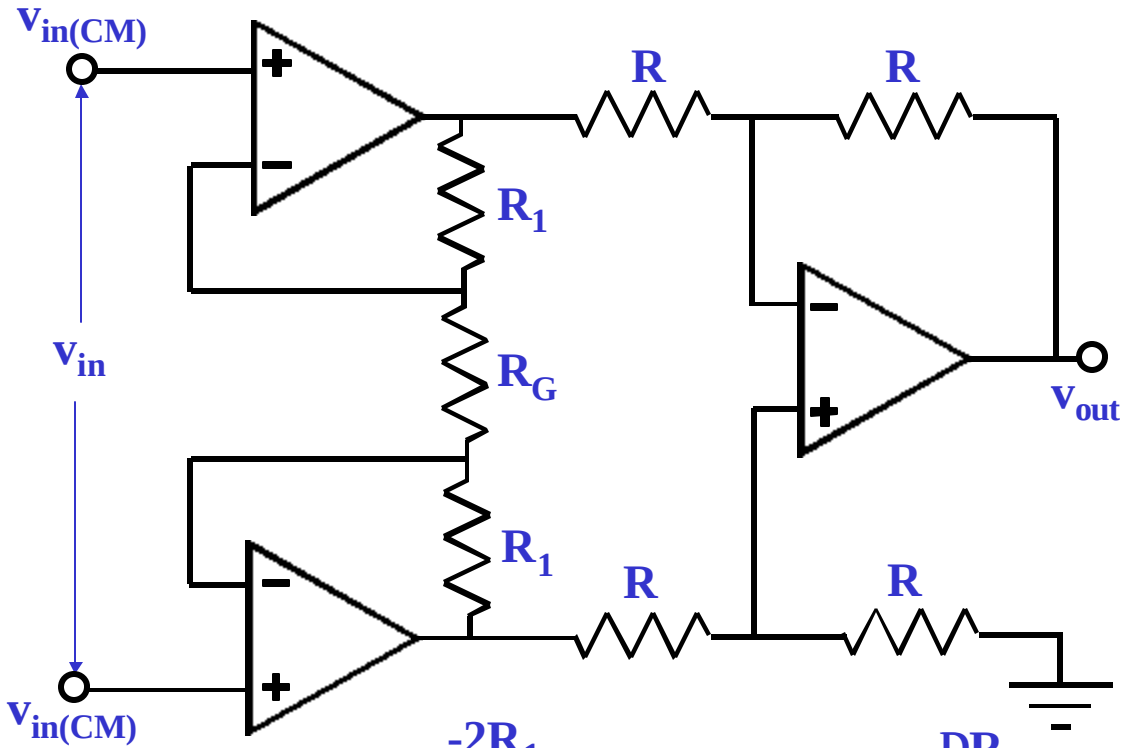
$$\frac{R_1}{R_2} = \frac{R_3}{R_4}$$

Transductor

Puente de Wheatstone

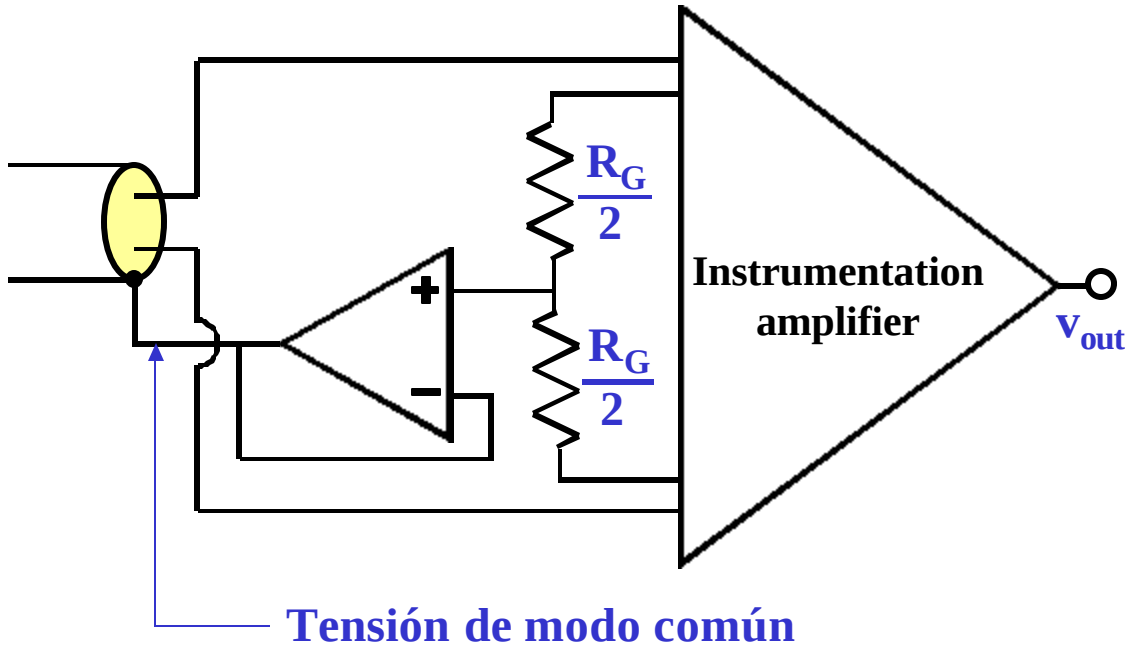
- **Transductores: convierten cantidades no electricas en cantidades electricas:**
  - **Ejemplos: fotoresistores, termistores, strain gage, etc.**
- **La señal diferencial de salida es pequeña.**
- **La señal de modo común es grande.**
- **Se utiliza un amplificador diferencial de alto CMRR.**

Instrumentation amplifier

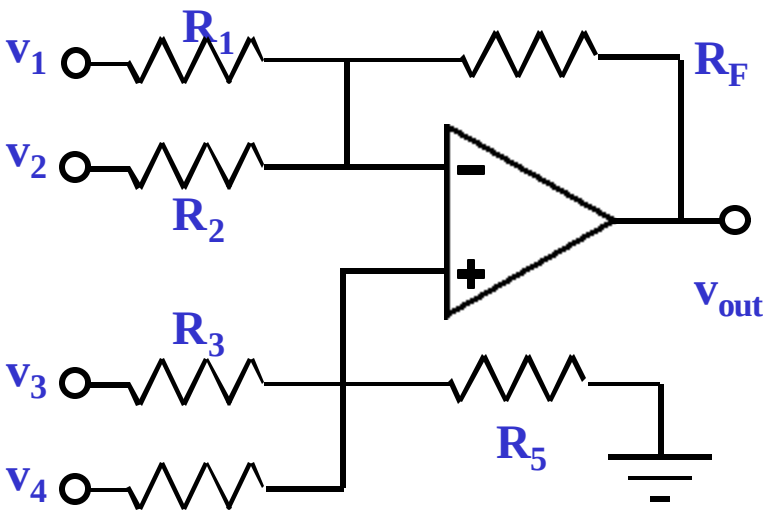


$$A_V = \frac{-2R_1}{R_G} + 1 \qquad A_{CM} = \pm 2\,\frac{DR}{R}$$

Tensión de guarda



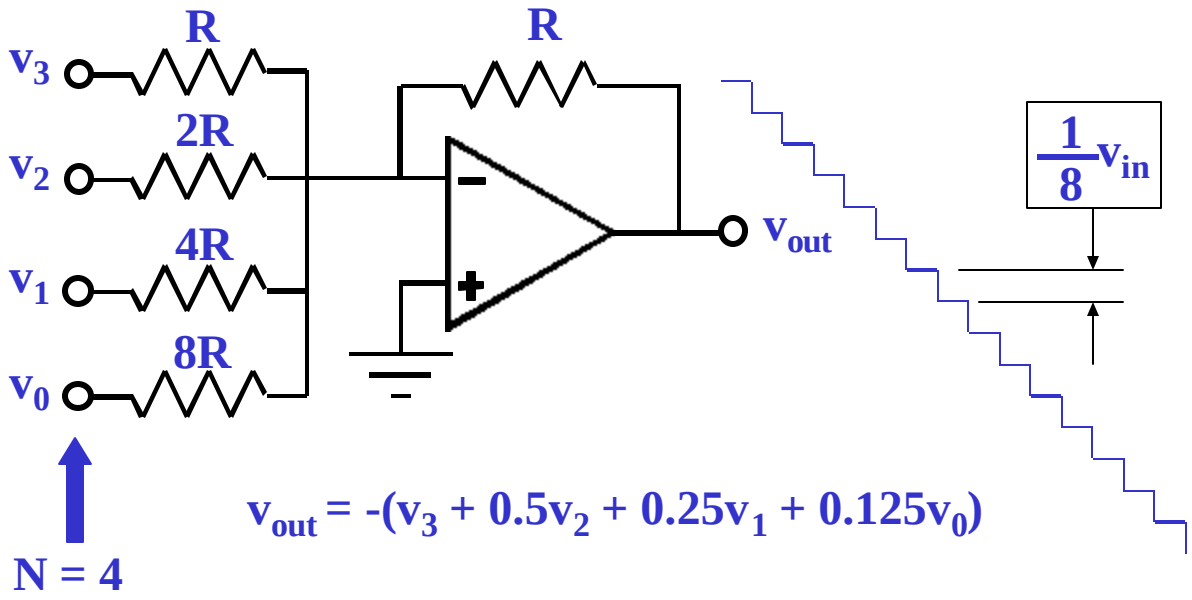
Amplificador sumador con entradas inversoras y no-inversoras



$$V_{out} = -\frac{R_F}{R_1}v_1 - \frac{R_F}{R_2}v_2 + \left(\frac{R_F}{R_1 // R_2} + 1\right)\left(\frac{R_4 // R_5}{R_3 + R_4 // R_5}\right)v_3 + \ldots$$

$$\ldots\left(\frac{R_F}{R_1 // R_2} + 1\right)\left(\frac{R_3 // R_5}{R_4 + R_3 // R_5}\right)v_4$$

Conversor D/A

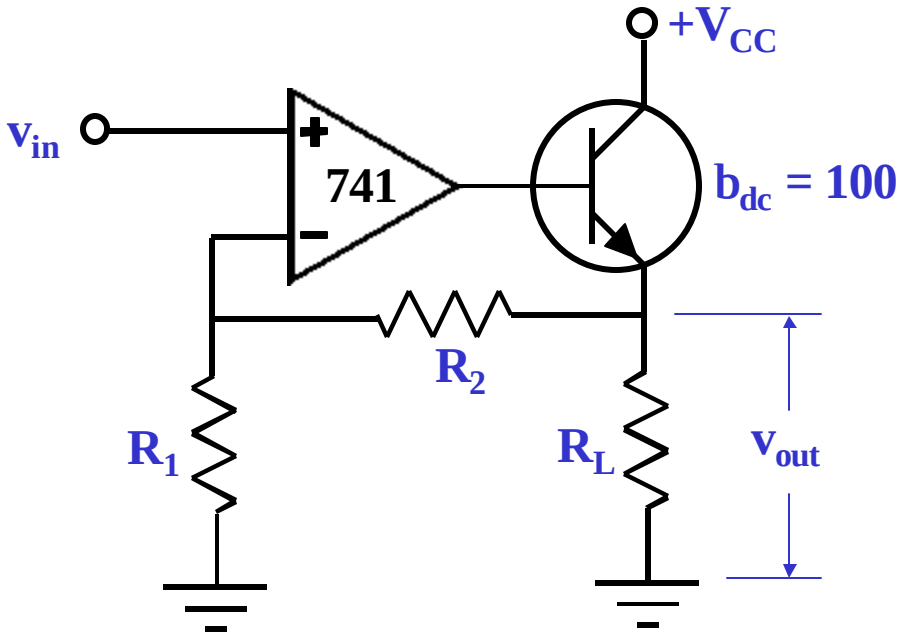


$v_{out} = -(v_3 + 0.5v_2 + 0.25v_1 + 0.125v_0)$

N = 4

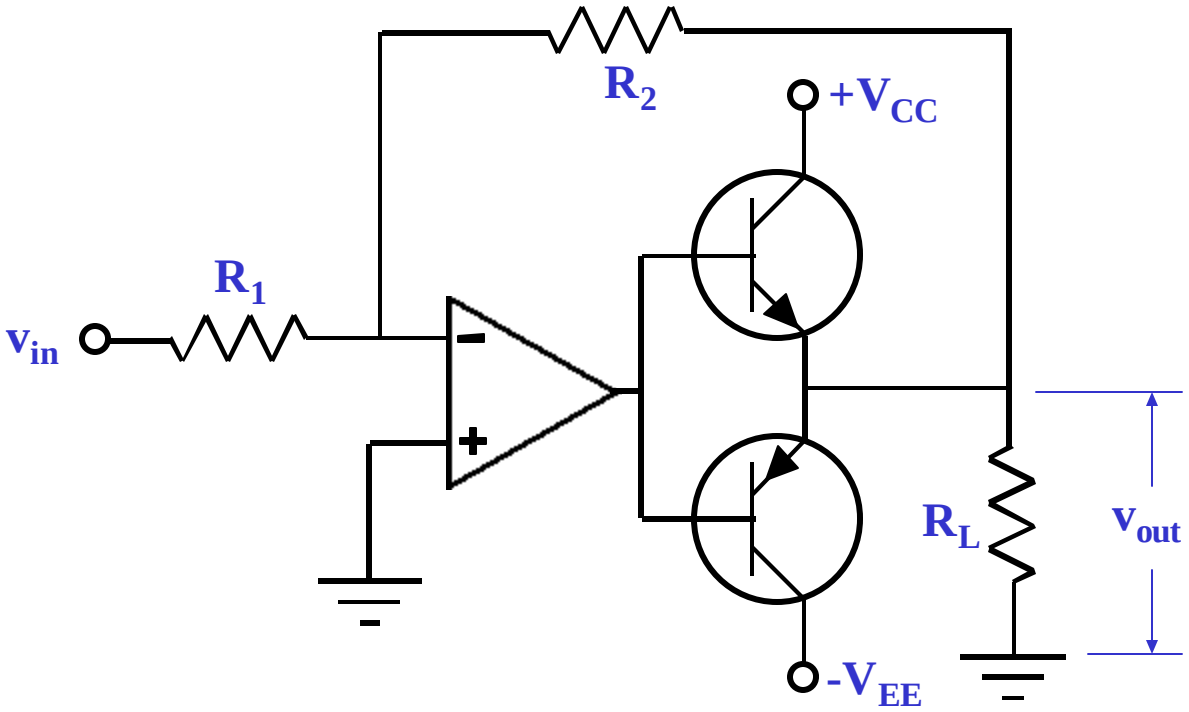
Combinaciones posibles = $2^N = 2^4 = 16$

Amplificador de corriente unidireccional

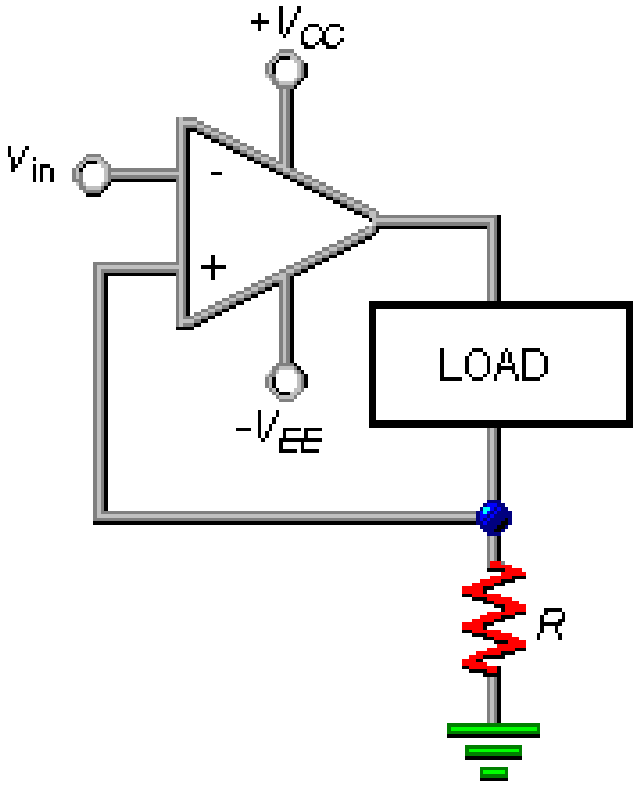


$I_{max} = b_{dc}I_{SC} = 100(25\ mA) = 2.5\ A$

Amplificador de corriente bidireccional



VCIS – Carga flotante



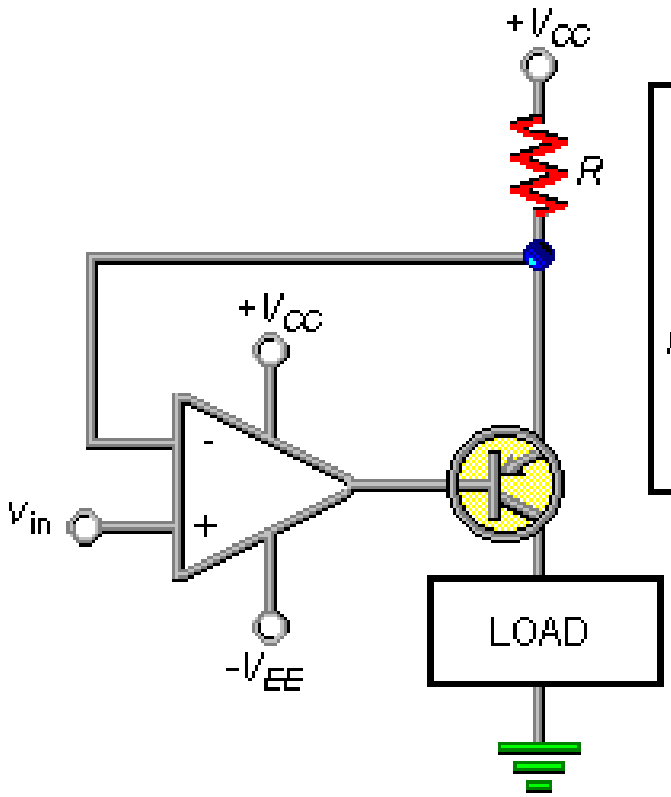
$$I_{out} = \frac{V_{in}}{R}$$

$$V_{L\,(max)} = V_{CC} - V_{in}$$

$$R_{L\,(max)} = R\left(\frac{V_{CC}}{V_{in}} - 1\right)$$

$$I_{max} = I_{SC}$$

VCIS – Carga a tierra



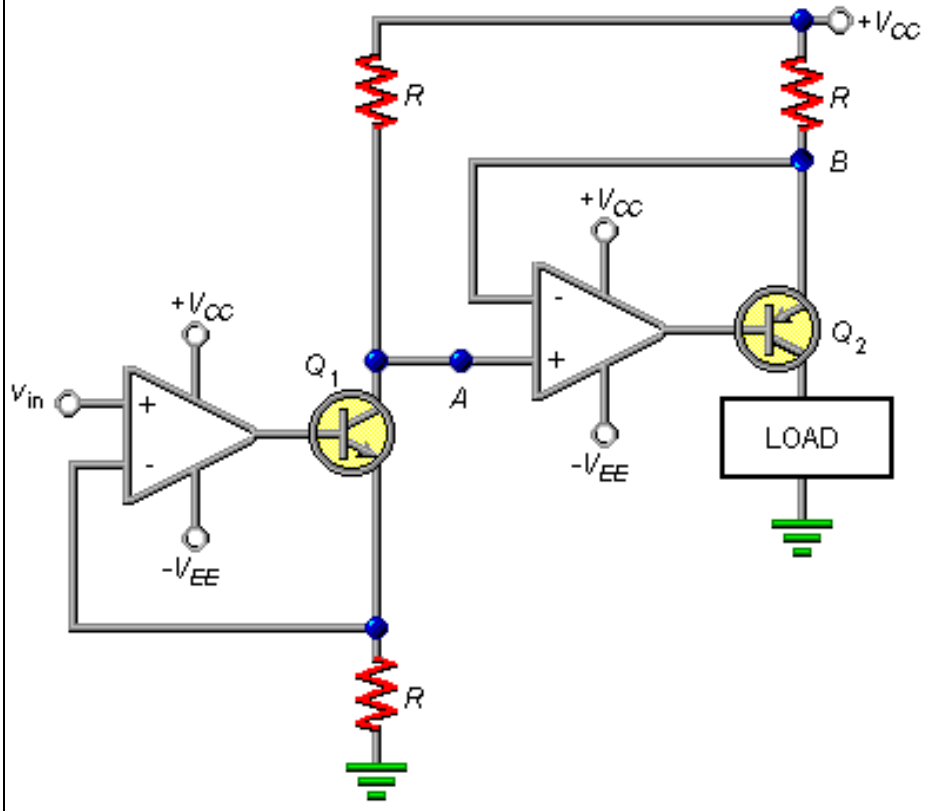
$$i_{out} = \frac{V_{CC} - v_{in}}{R}$$

$$V_{L\,(max)} = v_{in}$$

$$R_{L\,(max)} = \frac{R}{V_{CC}/v_{in} - 1}$$

$$I_{max} = \beta_{dc}\, I_{SC}$$

VCIS – Carga a tierra



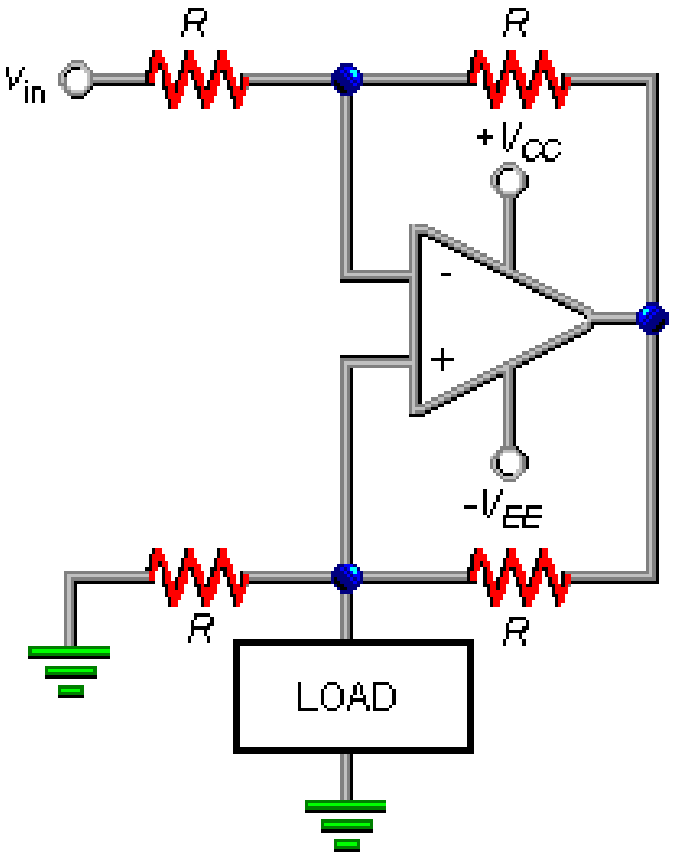
$$i_{out} = \frac{v_{in}}{R}$$

$$V_{L\,(max)} = V_{CC} - v_{in}$$

$$R_{L\,(max)} = R\left(\frac{V_{CC}}{v_{in}} - 1\right)$$

$$I_{max} = \beta_{dc}\, I_{SC}$$

Fuente de Howland



$$i_{out} = \frac{-v_{in}}{R}$$

$$V_{L\,(max)} = \frac{V_{CC} - v_{in}}{2}$$

$$R_{L\,(max)} = \frac{R}{2}\left(\frac{V_{CC}}{v_{in}} - 1\right)$$

$$I_{max} = I_{SC}$$

Amplificador inversor alimentación simple