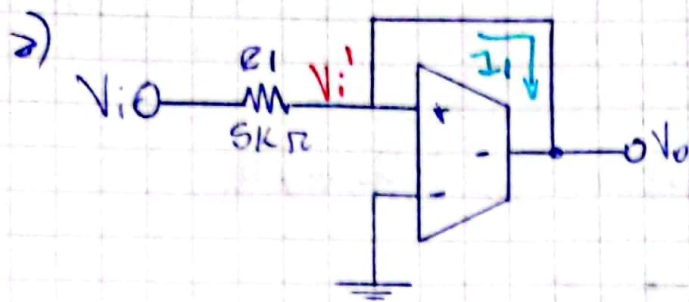


## Ejercicio 4 TPI



$$I_1 = g_m \cdot V_i'$$

$$Z_{out} = \frac{V_i'}{I_1} = \frac{V_i'}{g_m \cdot V_i'} = \frac{1}{g_m}$$

$$V_o = V_i \cdot \frac{Z_2}{Z_1 + Z_2}$$

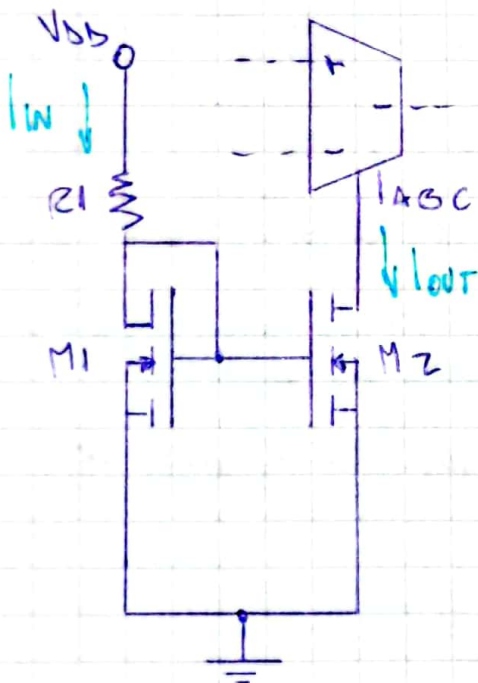
$$Z_1 = 5k\Omega ; Z_2 = \frac{1}{g_m}$$

- Busco  $g_m$  para  $Z_2 = 5k\Omega$ :

$$\frac{1}{g_m} = 5k\Omega \rightarrow g_m = 200 \mu S$$

b) Para  $g_m = 200 \mu S \rightarrow I_{ABC} \approx 16 \mu A$

Propongo fuente espejo MOSFET



$$I_{IN} = \frac{V_{DD} - V_{GS2}}{R_1}$$

$$S: \frac{W_1}{L_1} = \frac{W_2}{L_2} \rightarrow I_{IN} = I_{OUT} = 16 \mu A$$

$$V_{DD} = 1.5V ; V_{GS2} = V_T + \left( \frac{I_D}{\beta} \right)^{1/2}$$

$$V_T = 0.7V ; \beta = \frac{8 \mu A}{V^2}$$

$$V_{GS2} = 0.75V$$

$$R_1 = \frac{V_{DD} - V_{GS2}}{I_{IN}} = 890k\Omega$$

$$c) \frac{V_o}{V_i} = \frac{Z_2}{Z_1 + Z_2} = \frac{1}{2}$$

