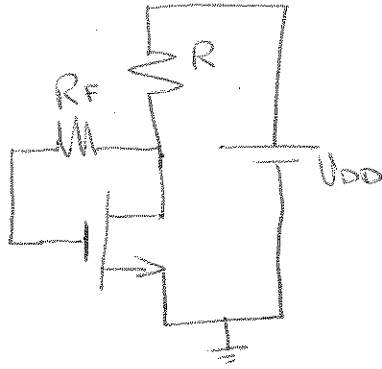


2º Ejercicio de refuerzo

a) Circuito DC



Suprimimos saturación: $V_{GS} > V_T$
 $V_{DS} > V_{GS} - V_T$

$$I_{DS} = \frac{K}{2} \frac{W}{L} (V_{GS} - V_T)^2$$

MALLA G-S

$$V_{DD} = I_{DS} \cdot R + V_{GS} \Rightarrow$$

$$\Rightarrow V_{DD} = \frac{K}{2} \frac{W}{L} (V_{GS} - V_T)^2 R + V_{GS} \Rightarrow$$

$$\Rightarrow 0.36 V_{GS}^2 + 0.28 V_{GS} - 14.64 = 0 \Rightarrow V_{GS} = \begin{cases} 6V \\ -6.78V \end{cases}$$

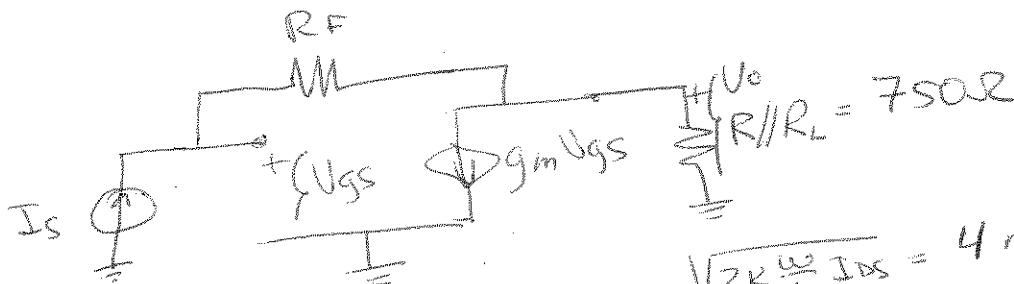
$$\Rightarrow I_{DS} = \frac{V_{DD} - V_{GS}}{R} = 10 \text{ mA}$$

MALLA D-S

$$V_{DD} = I_{DS} R + V_{DS} \Rightarrow V_{DS} = 6V$$

La solución cumple: $\begin{cases} V_{GS} > V_T \\ V_{DS} > V_{GS} - V_T \end{cases} \Rightarrow \text{SATURACIÓN OK}$

b)



$$g_m = \sqrt{2K \frac{W}{L} I_{DS}} = 4 \text{ mA/V}$$

$$c) V_{GS} - V_o = I_s R_F$$

$$I_s = g_m V_{GS} + \frac{V_o}{750 \Omega} = g_m (V_o + I_s R_F) + \frac{V_o}{750 \Omega} \Rightarrow$$

$$\Rightarrow I_s (1 - g_m R_F) = \left(g_m + \frac{1}{750 \Omega} \right) V_o \Rightarrow$$

$$\Rightarrow \frac{V_o}{I_s} = \frac{1 - g_m R_F}{g_m + \frac{1}{750 \Omega}} = \frac{1 - 4.50}{4 + \frac{1}{0.75}} = -37.31 \text{ K}\Omega$$