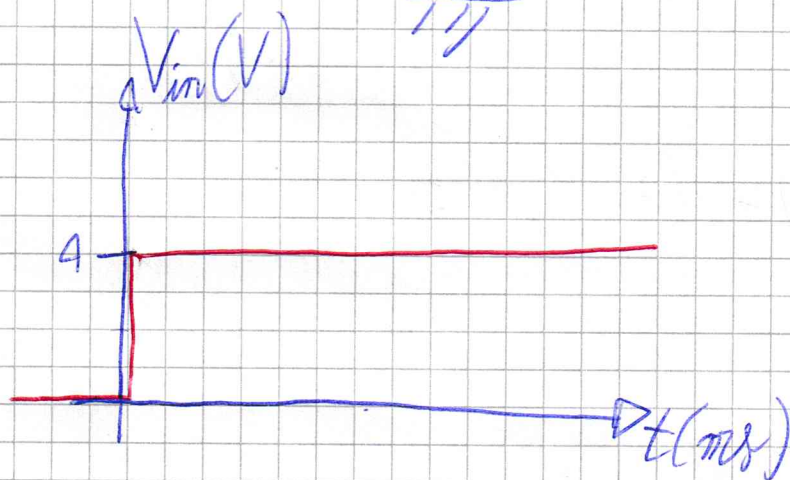
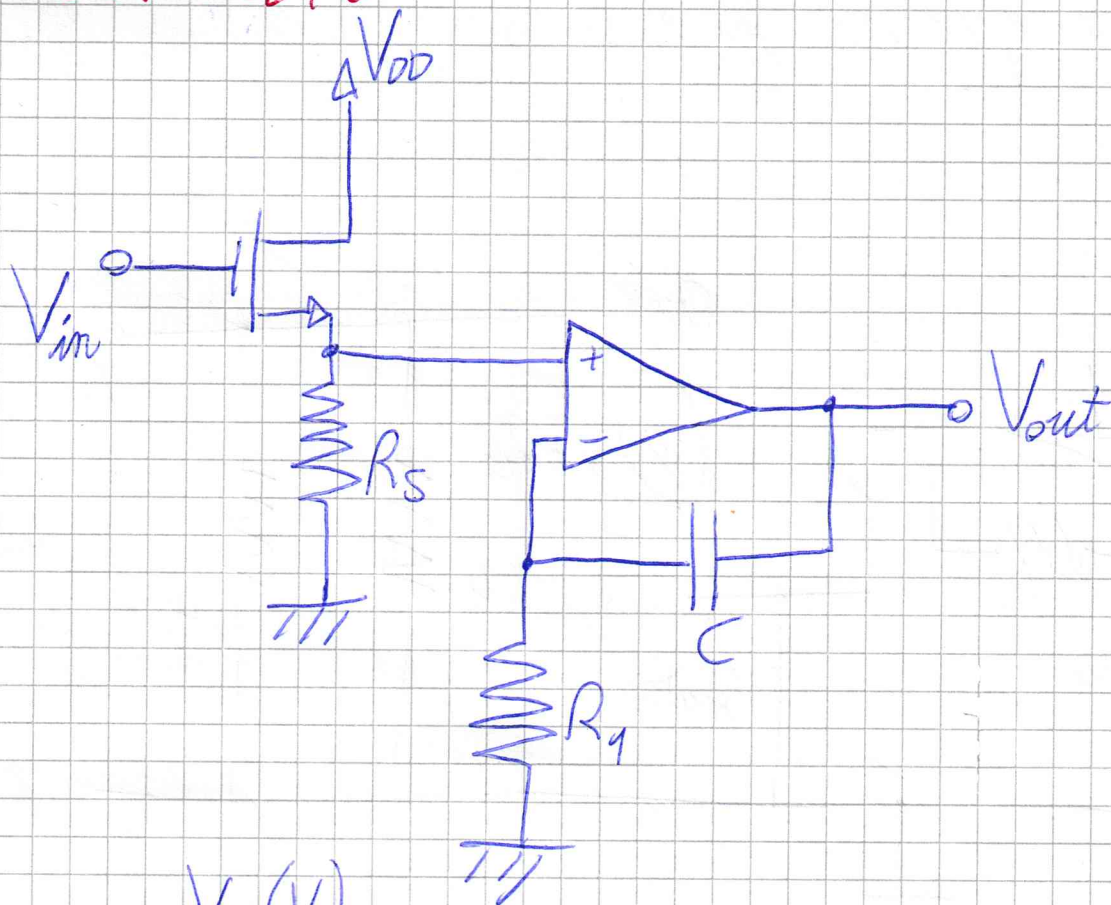


Esercizio



$$V^+ = V^- = 4V$$

$$Q_1 = \left\{ V_t = 1V; K = 0,5 \frac{mA}{V^2}; \lambda = 0 \right\}$$

$$V_{DD} = 10V \quad R_S = 0,5 K\Omega \quad R_1 = 1 K\Omega \quad C = 1 \mu F$$

~~2~~ 2 casi $V_{in} = 0V$, $V_{in} = 4V$

$$V_{in} = V_G$$

$$V_{in} = 0V$$

$$V_G = 0V$$

$$V_{GS} = 0V < V_t = 1V$$

Q_1 é interdetto

$$V_S = 0V = V^+$$

$$V_{out} = 0V$$

$$V_{in} = 4V$$

$$V_G = 4V$$

$$V_{GS} = V_G - V_S = V_G = 4V > V_t = 1V$$

$$i_D = K(V_{GS} - V_t)^2 = \frac{1}{2}(4-1)^2 = \frac{9}{2} \text{ mA}$$

$$V_{DS} = V_{DD} - i_D R_S = 10 - \frac{9}{2} \cdot \frac{1}{2} = 10 - \frac{9}{4} = \frac{40-9}{4} = \frac{31}{4}$$

~~$$V_{DS} = \frac{31}{4} V = 7,75 V > V_{GS} - V_t = 3V$$~~

$$V_{DS} = \frac{31}{4} V = 7,75 V > V_{GS} - V_t = 3V$$

Q_1 in saturazione

$$V_S = i_D R_S = \frac{9}{4} = 2,25V$$

$$V_S = V^+ = V^-$$

$$V_{out} = V_C = \frac{Q}{C} = \frac{\int i_C dt}{C} = \frac{1}{R_1 C} \int V^+ dt = 2,25$$

$$R_1 C = 10^3 \cdot 10^{-6} = 10^{-3} \text{ s} = 1 \text{ ms}$$

