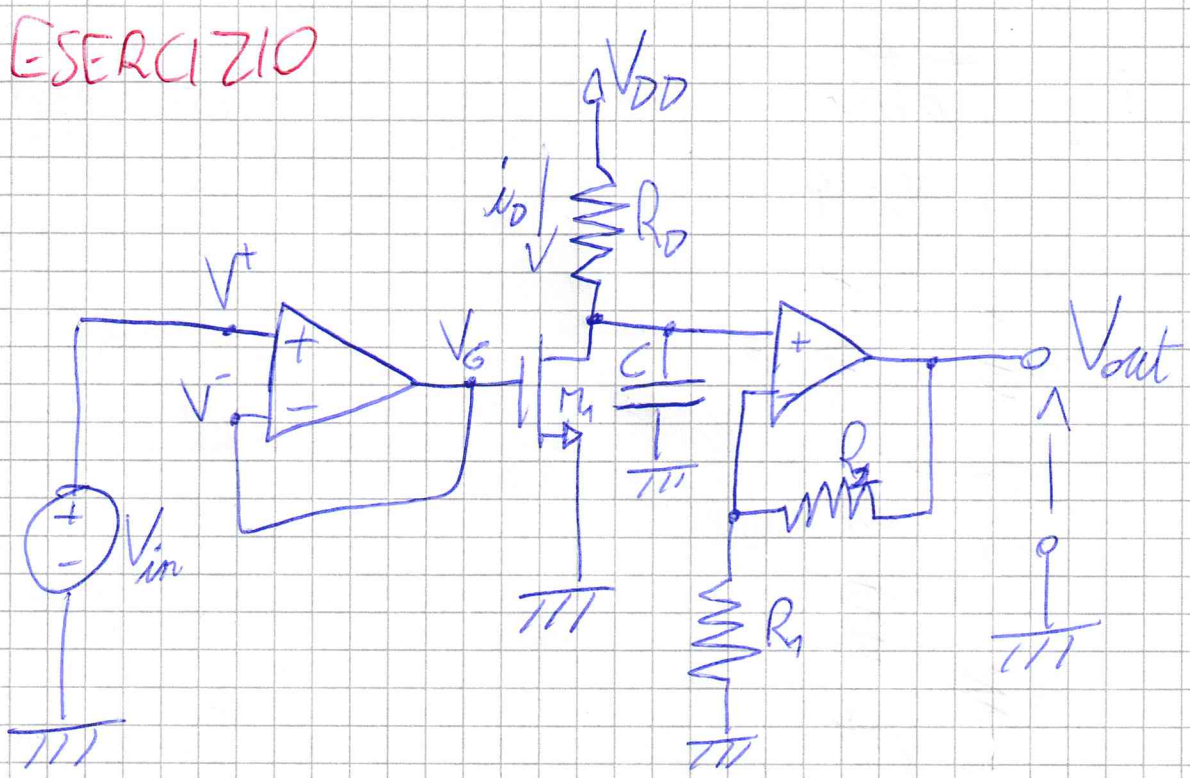
ESERCIZIO



$L^+ = |L^-| = 1_2 V$

$M_1 = \{ K = 0{,}5 \frac{mA}{V^2} ; V_t = 1V ; \lambda = 0 \}$

$V_{DD} = 5V \quad R_1 = R_2 = R_D = 1K\Omega \quad C = 1\mu F$

$V_{out} = V_{O2}$

$V_{IN} = V_1^+ = V_1^- = V_G$

2 casi $V_{IN} = 0V$ e $V_{in} = 3V$

$V_{IN} = 0V$

$V_G = 0V$

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

transistor interdetto

$V_O = V_{DD} - i_D R_D = V_{DD} = 5V$

$i_D = 0\ mA$

$V_Z^+ = 5V$

$V_{OZ} = V_Z^+ \left(1 + \frac{R_2}{R_1}\right) = 2V_Z^+ = 10V$

$V_{IN} = 3V$

$V_G = 3V$

$V_{GS} = V_G - V_S = V_G = 3V > V_t = 1V$

$V_{DS} = V_D - V_S = V_{DD} - i_D R_D = 5 - 2 = 3V$

$i_D = K(V_{GS} - V_t)^2 = \frac{1}{2}(3-1)^2 = 2$ mA

$V_{DS} = 3V > V_{GS} - V_t = 3 - 1 = 2V$

M_1 in saturazione

$V_D = V_Z^+ = V_{DD} - i_D R_D = 3V$

$V_{OZ} = V_Z^+ \left(1 + \frac{R_2}{R_1}\right) = 6V$

$\tau = CR_D = 10^3 \cdot 10^{-6} = 10^{-3} s = 1$ ms