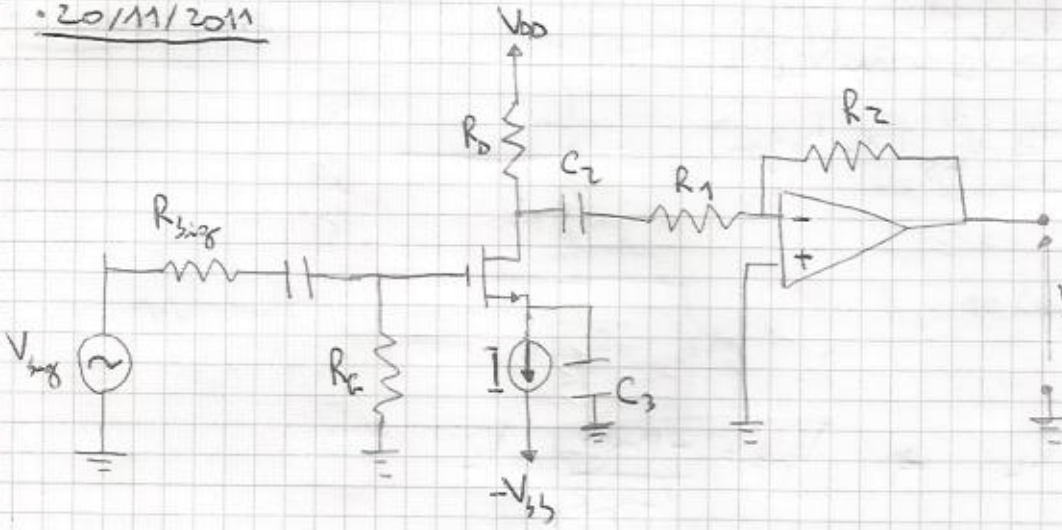
• 20/11/2011




$V_{DD} = V_{SS} = 10V$
$R_D = 3k\Omega$
$R_L = 5M\Omega$
$R_1 = 6k\Omega$ $R_2 = 60k$
$R_{sig} = 1k\Omega$
$C_1 = C_2 = \infty$
$V_T = 1V$ $k = 2$
$L^+ = -L^- = 10V$

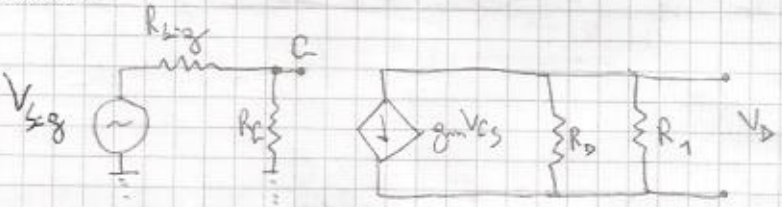
a) dimensione I? sapendo che $A_V = V_{out}/V_{sig} = 80$

$A = A_T \cdot A_A = 80$

Sappiamo che $A_A = -\frac{R_2}{R_1} = -10$ . quindi $A_T = \boxed{-8}$ , per la risoluzione $A_T \cdot A_A$

$= \frac{V_{out}}{V_D}$ $= \frac{V_D}{V_{sig}}$

Quindi:




$V_D = -g_m V_{GS} R_1 // R_D \Rightarrow \frac{V_D}{V_{sig}} = -8 = -g_m R_1 // R_D$

$g_m \cdot R_1 // R_D = 8 \Rightarrow g_m \cdot \frac{6 \cdot 3}{6+3} = 8 \Rightarrow g_m = 4$

$g_m = 2k(V_{GS} - V_T) \Rightarrow 4 = 4(V_{GS} - 1) \Rightarrow 4 = 4V_{GS} - 4 \Rightarrow \boxed{V_{GS} = 2V}$

$I = I_D = k(V_{GS} - V_T)^2 = 2 \cdot (2-1)^2 = \boxed{2mA = I}$