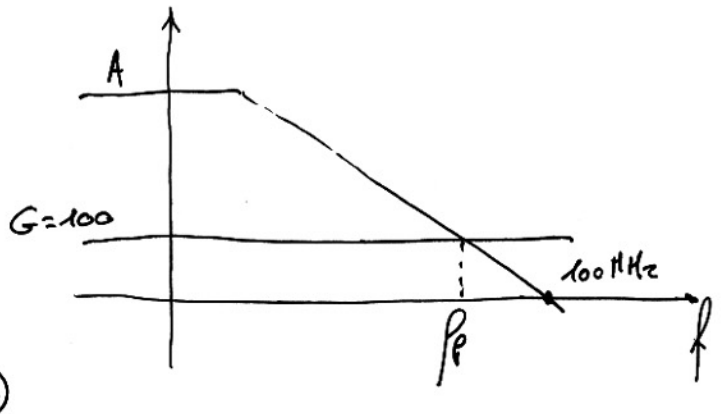
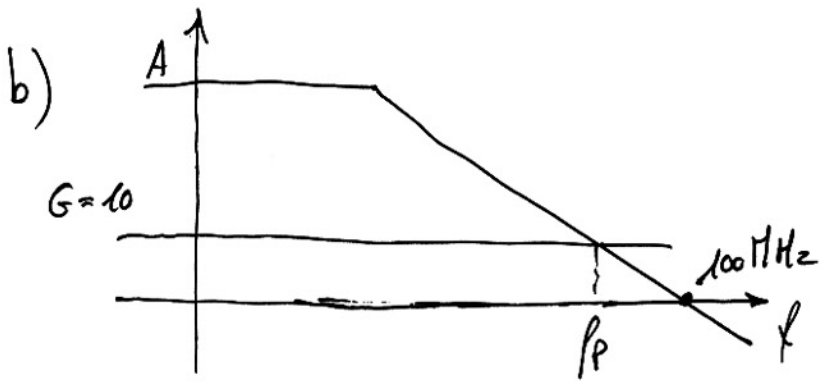
es1



a)

$$G = 1 + \frac{R_2}{R_1} = 1 + \frac{99K}{1K} = 100$$

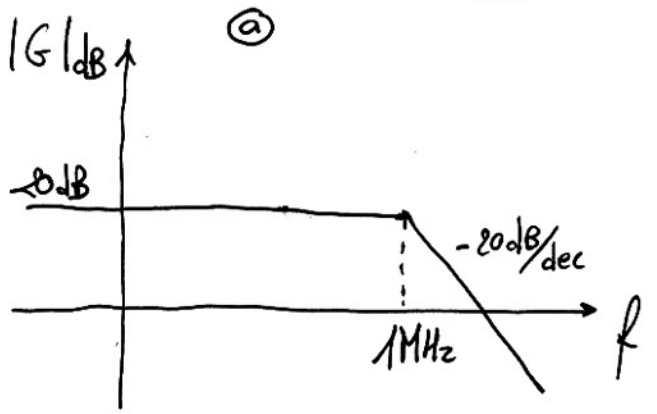
$$100 \cdot f_p = 1 \cdot 100MHz \rightarrow f_p = 1MHz$$

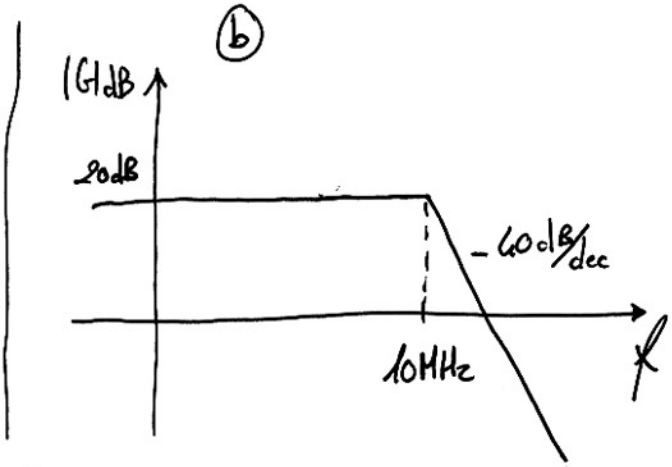


$$10 \cdot f_p = 1 \cdot 100MHz \rightarrow f_p = 10\ MHz$$

$$G = G_1 \cdot G_2 \qquad G_1 = G_2 = 1 + \frac{R_2}{R_1} = 10$$

GRAFICI DEI GUADAGNI AD ANELLO CHIUSO DEI 2 CIRCUITI





c) $V_{OUT,OFFSET,1} = G_1 \cdot G_2 \cdot V_{OS1} = 100 \times 50\,mV = 500\,mV$

$V_{OUT,OFFSET,2} = G_2 \cdot V_{OS2} = 10 \times 5\,mV = 50\,mV$

NEL CASO PEGGIORE I 2 CONTRIBUTI SI SOMMANO ⇒

$V_{OUT,OFFSET,TOT} = 550\,mV$

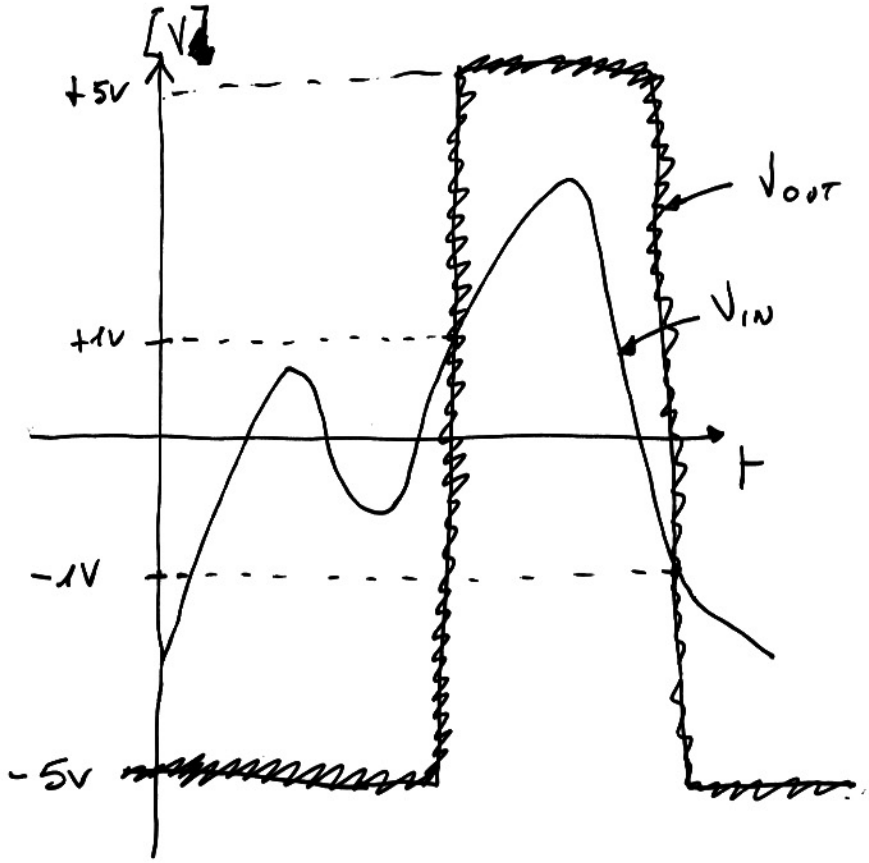
es2

a) $V_{OUT} = 5V$

$V_t = 4,17V$

b) $V_{IN} = -1V$

c)



es 3

a) $V_D = +2,5V$

$V_S = -2,5V$

$V_G = -1,05V$

$R_L = 340\ k\Omega$

b) $\frac{v_{out,s}}{v_{in}} = +0,97$

$\frac{v_{out,D}}{v_{in}} = -0,97$

c) $\frac{v_{out,s}}{v_{in}} = +0,75$

$\frac{v_{out,D}}{v_{in}} = -0,75$

es 4

a) $V_{OUT} = 0$

b) $I_{Dsat,\,pmos} = 40\,mA$

$V_{OUT} = 40\,mA \cdot 150\,\Omega = 6V \rightarrow$ IMPOSSIBILE
$(V_{OUT} > V_{CC})$

c) $V_{OUT} = +3,16V$