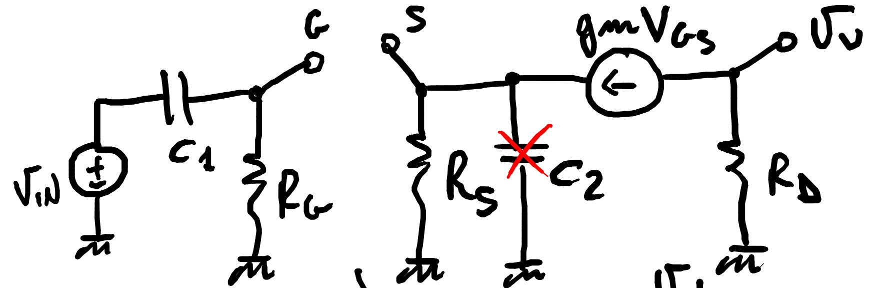
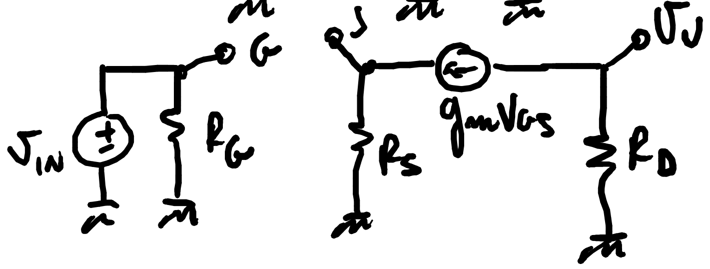




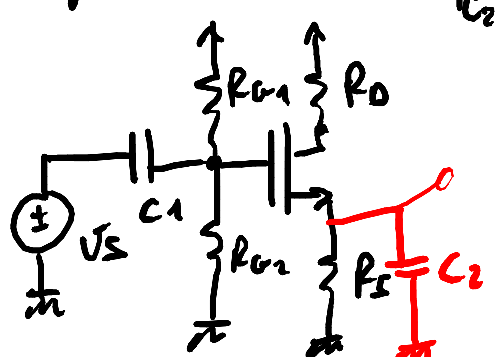
A_{v00} nel circuito di sopra senza C_2?

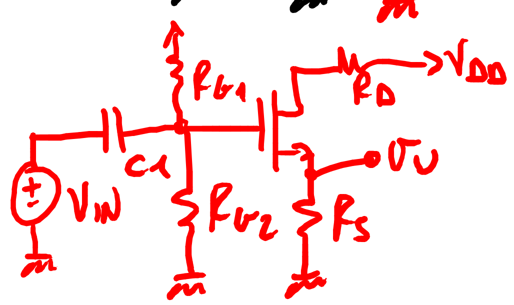
$v_U = -g_m R_D V_{GS}$

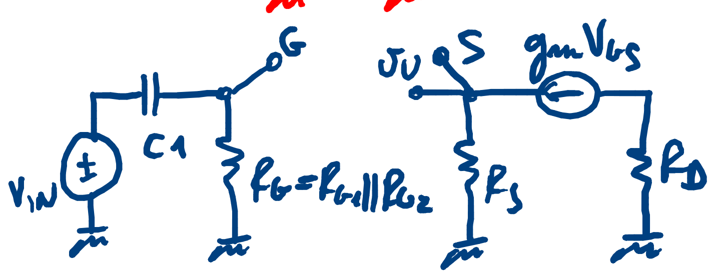
$V_{GS} = V_G - V_S = \dfrac{V_{IN}}{1+g_m R_S}$

$v_U = -\dfrac{g_m R_D}{1+g_m R_S} V_{IN}$ $\quad A_{v00}\Big|_{\overline{C_2}} = \dfrac{-g_m R_D}{1+g_m R_S}$

Se $g_m R_S \gg 1 \Rightarrow A_{v00}\Big|_{\overline{C_2}} \simeq -\dfrac{R_D}{R_S}$



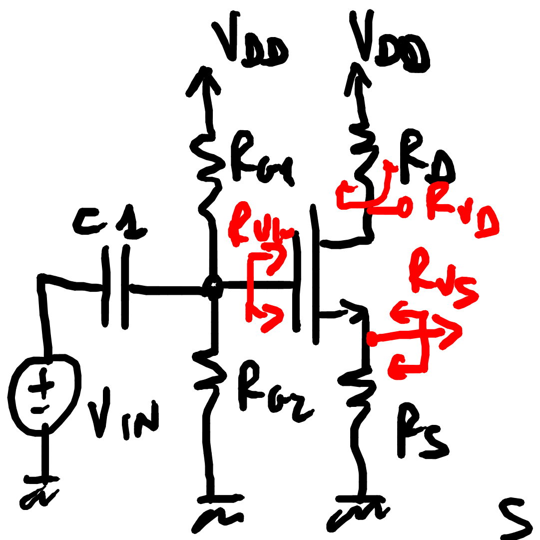




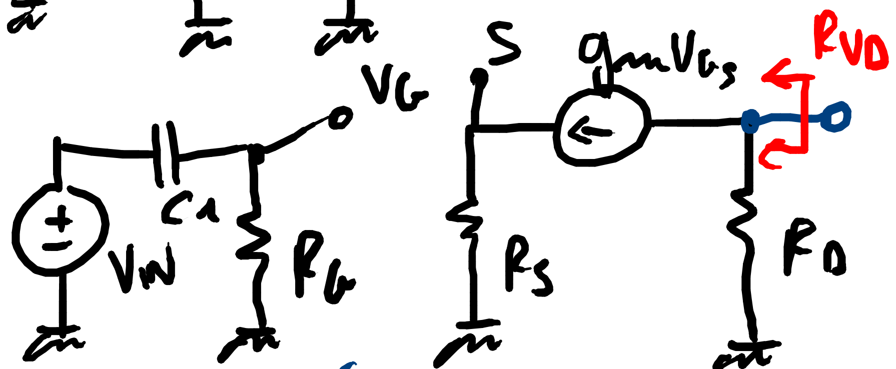
$v_U = g_m R_S V_{GS}$

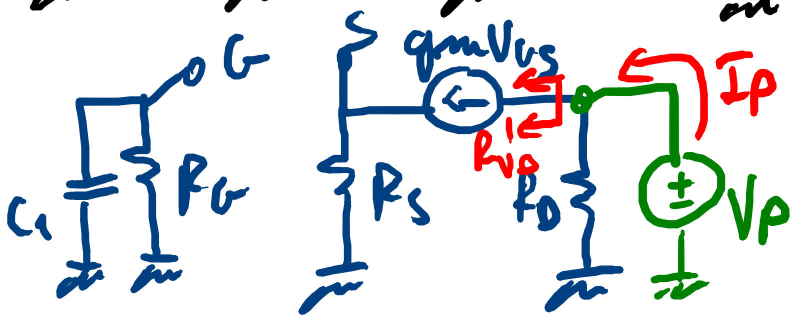
Per $s \to +\infty$ $\quad V_{GS} = \dfrac{V_{IN}}{1+g_m R_S}$

$v_U = \dfrac{g_m R_S}{1+g_m R_S} V_{IN}$ $\quad \dfrac{v_U}{V_{IN}} = \dfrac{g_m R_S}{1+g_m R_S} \xrightarrow{g_m R_S \gg 1} 1$



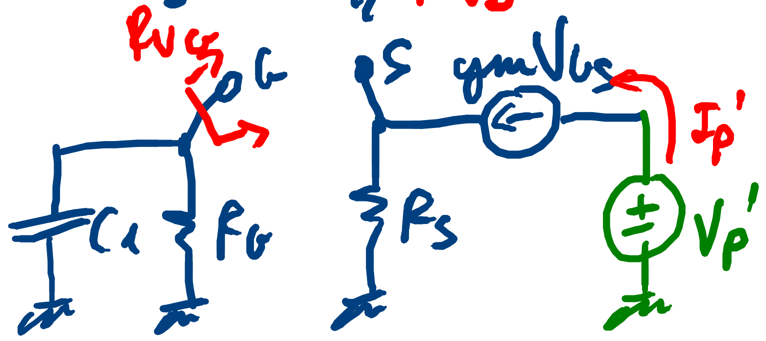
$$R_{VS} = R_S \,//\, \frac{1}{g_m}$$





$$R_{VD} = \frac{V_P}{I_P}$$

$$R_{VD} = R_D \,//\, R_{VD}'$$

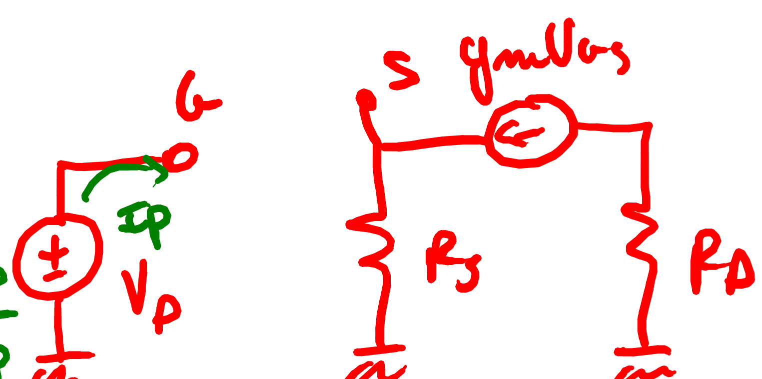


$$R_{VD}' = \frac{V_p'}{I_p'}$$

$I_p' = g_m V_{GS} = g_m(-V_S)$ perché $V_G = 0V$

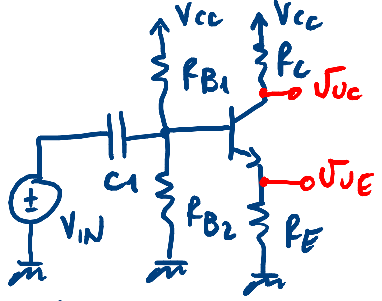
$V_S = g_m(-V_S) \cdot R_S \rightarrow V_S = 0 \rightarrow I_p' \rightarrow 0$

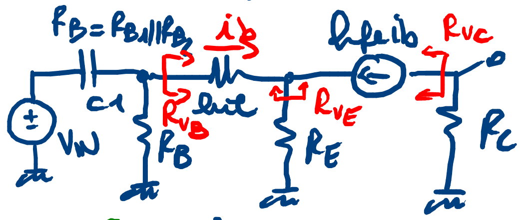
$R_{VD}' \rightarrow +\infty$ $\qquad R_{VD} = R_D$



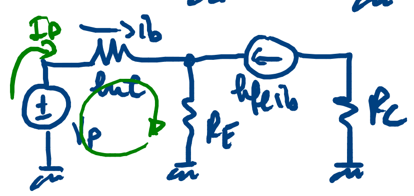
$$R_{VG} = \frac{V_p}{I_p}$$

$R_{VG} \rightarrow +\infty$





$\underline{R_{UB}}$

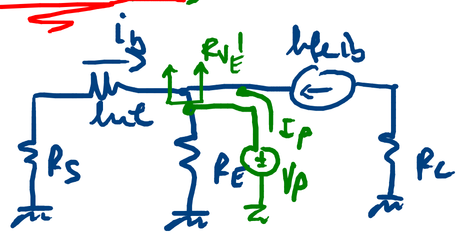


$R_{UB} = \dfrac{V_p}{I_p}$ $\qquad I_p = i_b$

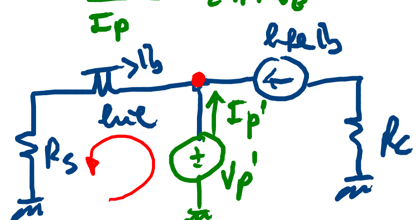
$V_p = h_{ie}\, i_b + R_E(h_{fe}+1) i_b$

$V_p = \left[h_{ie} + R_E(h_{fe}+1)\right] I_p \Rightarrow R_{UB} = \dfrac{V_p}{I_p} =$

$= \underline{h_{ie} + R_E(h_{fe}+1)}$



$R_{UE} = \dfrac{V_p}{I_p} = R_E // R_{UE}'$

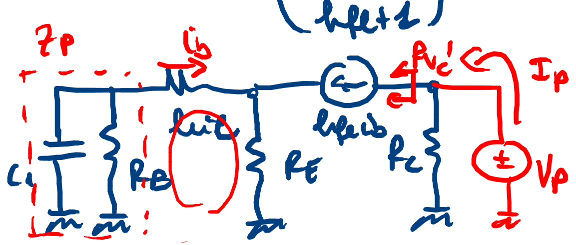


$R_{UE}' = \dfrac{V_p'}{I_p'}$ $\qquad V_p' = -(R_S + h_{ie})\, i_b$

$i_b = ? \Rightarrow I_p' = -(h_{fe}+1)\, i_b$

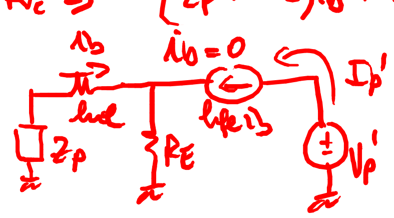
$i_b = \dfrac{-I_p'}{h_{fe}+1}$ $\qquad R_{UE}' = \dfrac{R_S + h_{ie}}{h_{fe}+1}$

$$R_{UE} = R_E // \left(\frac{R_S + h_{ie}}{h_{fe}+1}\right)$$



$R_{UC} = R_C // R_{UC}'$ $\qquad R_{UC}' \to +\infty$

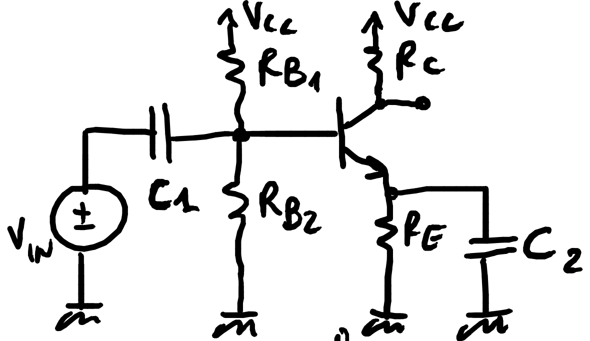
$R_{UC}' \Rightarrow \quad (Z_p + h_{ie})\, i_b + R_E(h_{fe}+1)\, i_b = 0$

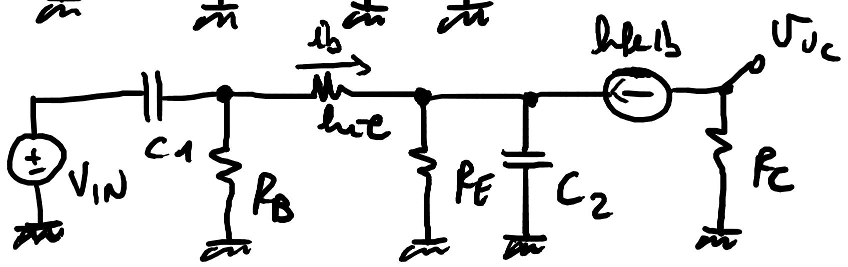


$R_{UC}' = \dfrac{V_p'}{I_p'}$

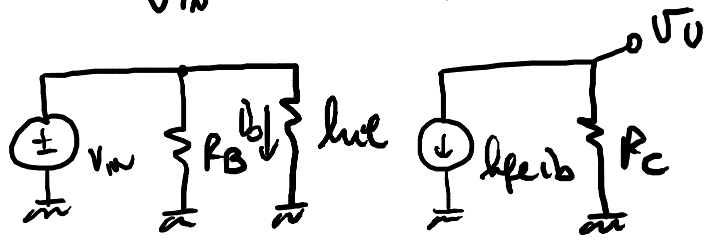
$I_p' = h_{fe}\, i_b = 0 \Rightarrow R_{UC}' \to +\infty$

$\boxed{R_{UC} = R_C}$





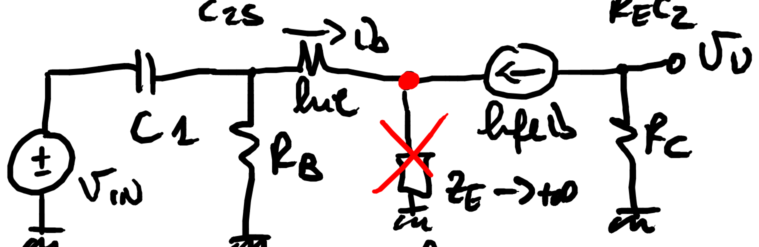
$$A_V(s) = \frac{v_{Uc}}{v_{IN}} = \frac{A_{V\infty} s\,(s+\omega_0)}{(s+\omega_{p1})(s+\omega_{p2})}$$



$v_U = -h_{fe} i_b R_c \qquad i_b = \frac{V_{IN}}{h_{ie}}$

$$\frac{v_U}{v_{IN}} = A_{V\infty} = -\frac{h_{fe}}{h_{ie}} R_c$$

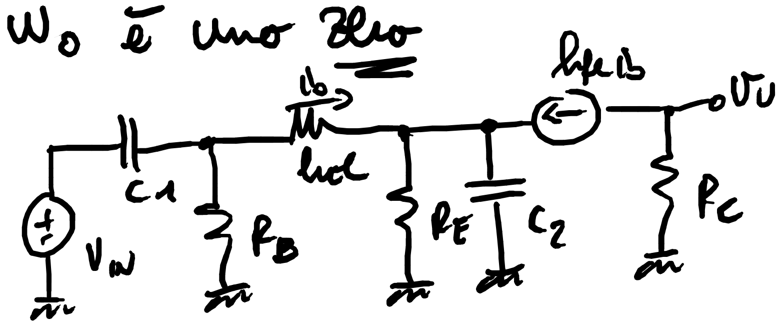
Se $R_E \| \frac{1}{C_2 s} \to +\infty \qquad \omega_0 = \frac{1}{R_E C_2}$



$i_b = -h_{fe} i_b \Rightarrow i_b = 0$

$v_U = -R_c h_{fe} i_b \Rightarrow v_U\left(\omega_0 = \frac{1}{R_E C_2}\right) \to 0$

ω_0 è uno zero

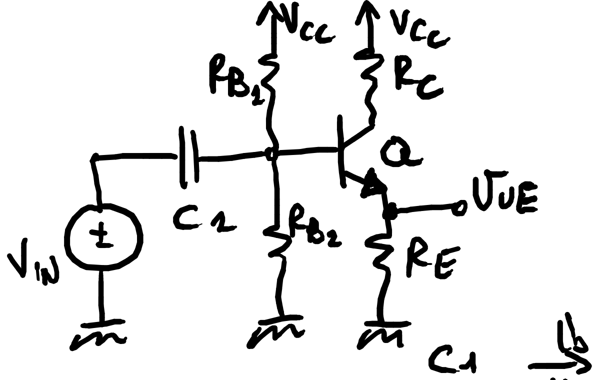


$\omega_{p2} \gg \omega_{p1}$

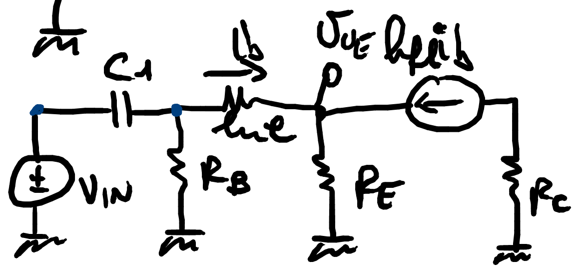
$$\omega_{p1} = \frac{1}{C_1 R_{V_{C1}}^{0}} \qquad \omega_{p2} = \frac{1}{C_2 R_{V_{C2}}^{C1}}$$

$R_{V_{C1}} = R_B \| [h_{ie} + R_E(h_{fe}+1)]$

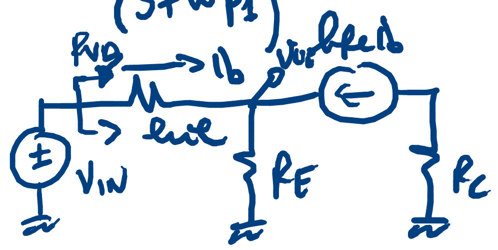
$R_{V_{C2}}^{C1} = R_E \| \left[\frac{h_{ie}}{h_{fe}+1}\right]$



$\frac{v_{UE}}{v_{IN}} = A_{vE} \Rightarrow$



$$A_{vE} = \frac{\quad}{(s+\omega_{p1})}$$



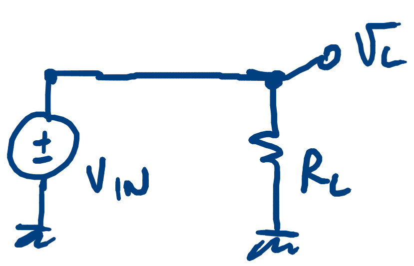
$$v_{UE} = R_E(h_{fe}+1)\, i_b$$

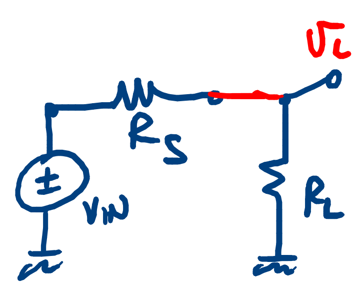
$$i_b = \frac{V_{IN}}{R_{VB}} = \frac{V_{IN}}{h_{ie}+R_E(h_{fe}+1)}$$

$$A_{v\infty} = \frac{v_{UE}}{V_{IN}} = \frac{R_E(h_{fe}+1)}{h_{ie}+R_E(h_{fe}+1)}$$

$R_E(h_{fe}+1) \gg h_{ie}$ $\quad A_{v\infty} \to 1$

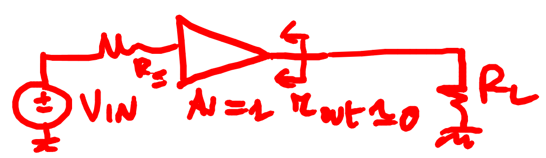
$$A_{vE} = \frac{A_{v\infty}\, s}{(s+\omega_{p1})}$$

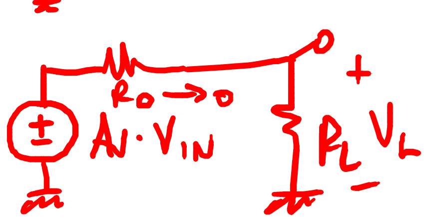




$v_L \neq V_{IN}$ $\quad V_L = \frac{R_L}{R_L+R_S} V_{IN}$

$R_L \gg R_S \Rightarrow V_L \simeq V_{IN}$





$V_L \simeq A_v V_{IN} \simeq V_{IN}$

$$V_L = \frac{R_L}{R_L+R_o} A_v V_{IN} \quad \begin{cases} A_v \to 1 \\ R_o \to 0 \end{cases} \Rightarrow V_L \to V_{IN}$$