## ESERCIZIO 1

$$A(f) = -\frac{1}{j2\pi f RC}$$

$$|A(f)| = k \Rightarrow \frac{1}{2\pi f_0 RC} = k \Rightarrow R = \frac{1}{2\pi k f_0 C}$$

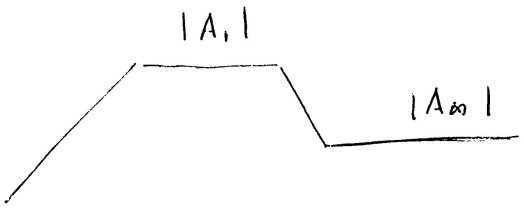
## ESERCIZIO 2

$$A(f) = -A_1 \frac{j\frac{f}{f_{P1}}\left(1+j\frac{f}{f_Z}\right)}{\left(1+j\frac{f}{f_{P1}}\right)\left(1+j\frac{f}{f_{P2}}\right)}$$

$$A_1 = 1 + \frac{R_2}{R} \qquad (A_\infty = -1)$$

$$f_{P1} = \frac{1}{2\pi R_1 C_1} \qquad f_{P2} = \frac{1}{2\pi R_2 C_2}$$

$$f_Z = \frac{1}{2\pi C_2 (R_2 \| R)}$$



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$I_C \simeq I_C + I_B = \dfrac{V^+}{2R_C}$ $\qquad V_{CE} = V^+ - (R_C + R_E) I_C$ -

$I_B =$ (dalle caratt.) $= I_D$

$V_{GS} = \sqrt{\dfrac{2 I_D}{\beta}} + V_T$

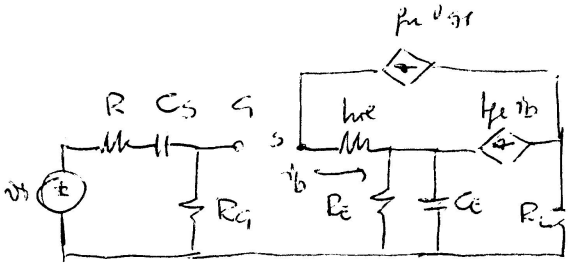
$R_2 = (R_1 + R_2) \dfrac{V_{GS}}{V^+}$ $\qquad R_1 = R_T - R_2 =$

$V_{DS} = V_{CE} - V_f > V_{GS} - V_T$

$g_m = \beta (V_{GS} - V_T) =$

$h_{fe} =$ $\qquad h_{ie} = r_{bb'} + \dfrac{V_T}{I_C} h_{fe}$

$R_G = R_1 \parallel R_2$



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$$v_u = -R_c(h_{fe}+1)\,i_b = -R_c(h_{fe}+1)\,g_m v_{gs}$$

$$v_{gs} = \frac{R_B}{R+R_B}v_i - [h_{ie} + R_E(h_{fe}+1)]\,g_m v_{gs}$$

$$v_{gs}\left[1 + g_m[h_{ie} + R_E(h_{fe}+1)]\right] = \frac{R_B}{R+R_B}v_i$$

$$\left.\frac{v_u}{v_i}\right| = -\frac{R_B}{R+R_B}\,\frac{R_c(h_{fe}+1)\,g_m}{1+g_m[h_{ie}+R_E(h_{fe}+1)]} =$$

$C_E$ efekt

$$\left.\frac{v_u}{v_i}\right|_{C_E\ dům} = -\frac{R_B}{R+R_B}\,\frac{R_c(h_{fe}+1)\,g_m}{1+g_m h_{ie}} =$$

$$f_{PCB} = \frac{1}{2\pi C_B(R+R_B)} =$$

$$R_{iCE} = R_E \parallel \frac{h_{ie}+\frac{1}{g_m}}{(h_{fe}+1)} =$$

$$f_{PCE} = \frac{1}{2\pi C_E R_{iCE}} =$$

$$f_{2CE} = \frac{1}{2\pi R_E C_E} =$$

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$$A(f) = A_{CB} \frac{j\frac{f}{f_+}\left(1+j\frac{f}{f_2}\right)}{\left(1+j\frac{f}{f_{P_1}}\right)\left(1+j\frac{f}{f_{P_2}}\right)}$$

$$|A(f)| = \frac{|A_{CB}|}{\sqrt{2}} \Rightarrow \frac{1}{2} = \frac{\left(\frac{f}{f_+}\right)^2\left(1+\frac{f^2}{f_2^2}\right)}{\left(1+\frac{f^2}{f_{P_1}^2}\right)\left(1+\frac{f^2}{f_{P_2}^2}\right)}$$

$$\Rightarrow f^4\left(\frac{1}{f_{P_1}^2 f_{P_2}^2} - \frac{2}{f_+^2 f_2^2}\right) + f^2\left(\frac{1}{f_{P_1}^2} + \frac{1}{f_{P_2}^2} - \frac{2}{f_+^2}\right) + 1 = 0$$

da cui le soluzioni

6) $R_{VC_L} = R_L \Rightarrow f_H = \frac{1}{2\pi R_L C_L} \Rightarrow C_L = \frac{1}{2\pi R_L f_H}$

7) $R_{VC_E} = (R \| R_G) + R_D\left[(\mu+1)\frac{g_m(R\|R_G)}{1+g_m h_{re}} + 1\right]$

(CR fornisce anche uno zero)

ESERCIZIO 4

ok

$$A_1 = + \frac{h_{fe} R_C}{h_{ie} + R_B} \cdot \frac{R_E \parallel \frac{h_{ie} + R_2}{h_{fe}+1}}{R_1 + \left( R_E \parallel \frac{h_{ie} + R_2}{h_{fe}+1} \right)} =$$

$$A_2 = \frac{- h_{fe} R_C}{R_2 + h_{ie} + (R_E \parallel R_1)(h_{fe}+1)} =$$

$$A_C = A_1 + A_2 =$$

$$A_d = 0.5 \left( A_1 - A_2 \right) =$$

$$|\rho| = \left| \frac{A_d}{A_C} \right| \qquad (\quad dB)$$