ELETTRONICA ANALOGICA

[Formulario Esame]

A CURA DI ALESSANDRO PAGHI

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LINK AL CORSO ANNO 2016/2017: http://brahms.iet.unipi.it/elan/

FREQUENTAZIONE: Consigliata.

$A = \frac{V_u}{V_p}\Big|_{V_i=0}$ $\beta = \frac{V_r}{V_u}\Big|_{V_i=0}$ $Z_i = \frac{V_p}{I_p}\Big|_{V_i=0}$

$\gamma = \frac{V_u}{V_i}\Big|_{V_p=0}$ $\alpha = \frac{V_r}{V_i}\Big|_{V_p=0}$ $\rho = \frac{I_p}{V_i}\Big|_{V_p=0}$

V_i agisce su V_r, anche tramite V_u $\rightarrow \alpha = \beta\gamma$

V_p agisce su V_r, anche tramite V_u $\rightarrow \beta$ g.d.t.

$\rho = 0 \rightarrow Z_p = Z_i$; $A_f = \gamma + \frac{\alpha A}{1-\beta A}$; $\alpha = \beta\gamma \rightarrow A_f = \frac{\gamma}{1-\beta A}$

$R_{uB} = h_{ie} + R_E(h_{fe}+1)$

$R_{uE} = R_B / (h_{fe}+1)$

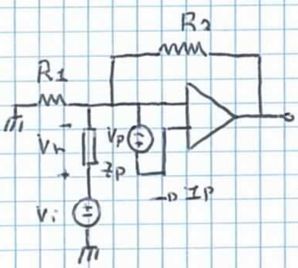
$R_{uC\,(C.E.)} = \frac{1}{h_{oe}}\left(1 + \frac{h_{fe} \cdot R_E}{R_E + h_{ie}}\right)$

$R_{uS} = \frac{1}{g_m}$

$h_{fe} = \frac{i_c}{i_b}$; $i_b = \frac{i_c}{h_{fe}}$

$i_b = \frac{i_E}{h_{fe}+1}$; $i_c = i_E \cdot \frac{h_{fe}}{h_{fe}+1}$

A.O. NON INVERTENTE



$\rho = 0$; $Z_p = \infty$

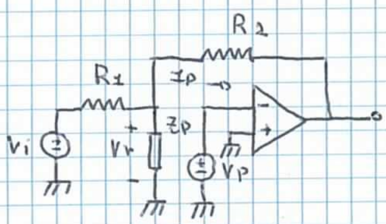
$A = A_{vo0}$

$\beta = -R_1/(R_1+R_2)$

$\gamma = 0$

$\alpha = 1$

A.O. INVERTENTE



$\rho = 0$; $Z_p = \infty$

$A = -A_{vo0}$

$\beta = R_1/(R_1+R_2)$

$\gamma = 0$

$\alpha = R_2/(R_1+R_2)$

$\alpha \cdot PGB = |A_{AO0}| \cdot \omega_{pAO}$ $\rightarrow A_{AO}(s) = A_{AO0} \cdot \frac{1}{1+\frac{s}{\omega_{pAO}}}$

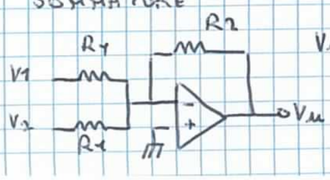
$PGB = A_{vo0} \cdot f_p \cdot 2\pi$

$S_{e\,MOS} = \frac{8}{3}\frac{KT}{g_m}$, $S_{I\,MOS} = 2qI_G$

$S_{e\,BJT} = 4KT r_{bb'} + 2qI_B r_{bb'}^2 + \frac{2qI_c}{g_m^2}$; $S_{I\,BJT} = 2qI_B$

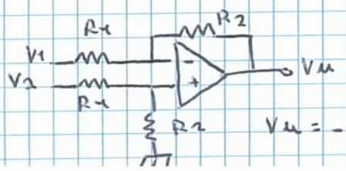
$g_m = \frac{I_c}{V_T}$; $r_{bb'} = h_{ie} - r_{b'e} = h_{ie} - \frac{h_{fe}}{g_m}$

SOMMATORE



$V_u = -\frac{R_2}{R_1}(V_1+V_2)$

SOTTRATTORE



$V_u = -\frac{R_2}{R_1}(V_1 - V_2)$

SQUADRA RC

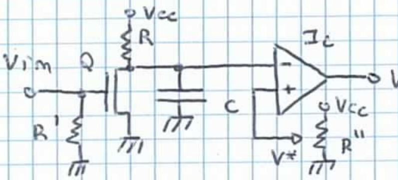
m - ESIMA COMPONENTE

T. CARICA : $V_C(t) = V_{FIN} + (V_{IN} - V_{FIN})\, e^{-t/\tau}$

$A_m = \frac{4}{m\pi}$, $V_m = A_m \cdot V_P$

T. SCARICA : $V_C(t) = V_{IN}\, e^{-t/\tau}$

MONOSTABILE



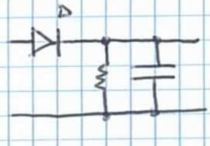
$V_C(t) = V_{FIN} + (V_{IN} - V_{FIN})\, e^{-t/\tau}$

$t = t^* \rightarrow V_C(t) = V^*$

$V_{FIN} = V_{CC}$, $V_{IN} = \emptyset$

Q = BSR202N , I_C = μA741

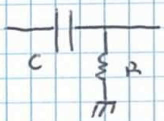
RADDR. SINGOLA SEMIONDA



$\tau = R \cdot C = 20 \cdot \frac{1}{f_{min}}$

D = 1N4148

SQUADRA CR



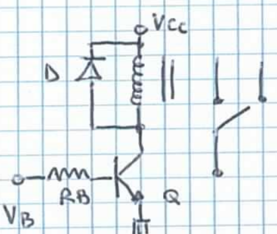
R = 250 KΩ

IMPULSO 100 μs

τ = 100 μs

$\tau = R \cdot C$

BJT - RELÈ



$I_{RELÈ} = 40\,mA$

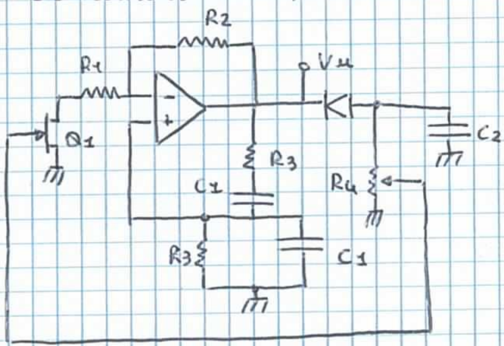
$R_B = \frac{V_B - V_\gamma}{I_B}$

$I_B \gg \frac{I_C}{h_{FE}}$

Q = 2N1711

$h_{FE} = 100$

OSCILLATORE A PONTE DI WIEN

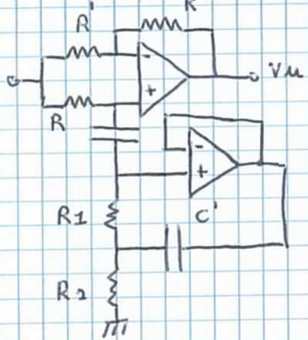


$\omega_0 = 1/C_1 R_3$, $R_2 = 2(R_1 + r_{diff})$

Q_1 : F245B , $R_1 = 650\,\Omega$, $R_2 = 2200\,\Omega$

$R_4 \cdot C_2 = 20 \cdot 1/f$

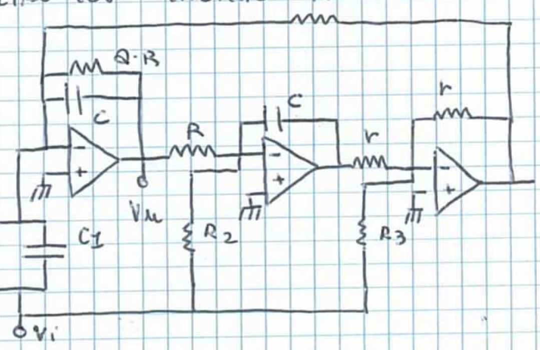
FILTRO NOTCH



$R = R_1 + R_2$, $\omega_0 = 1/\sqrt{LC}$

$L = R_1 R_2 C'$, $Q = 1/2\omega_0 RC > 30$

FILTRO TOW - THOMAS



(R_1, R_2, R_3, C_1)

LP : ∞, $R/|H(\emptyset)|$, ∞, ∅

HP : ∞, ∞, ∞, $C \cdot |H(\infty)|$

BP^+ : ∞, ∞, $rQ/|H(\omega_0)|$, ∅

BP^- : ∞, $RQ/|H(\omega_0)|$, ∞, ∅

AP : ∞, $R/|H(\emptyset)|$, $rQ/|H(\emptyset)|$, $C \cdot |H(\emptyset)|$

NOTCH : ∞, $R/|H(\emptyset)|$, ∞, $C \cdot |H(\emptyset)|$

$\omega_0 = 1/RC$, r = 10 KΩ , Q > 200 SELETTIVO