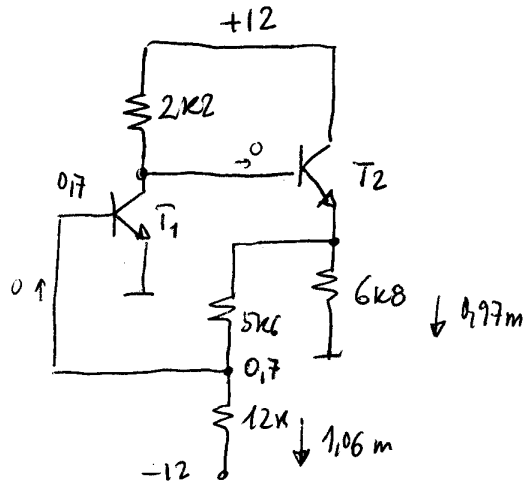
Resolução (compacta):

a)



$V_{E2} = 0,7 + 5K6 \cdot 1,06m = 6,63\ V$

$I_2 = 2,03\ mA$ ②

$V_{C1} \equiv V_{B2} = 7,33\ V$

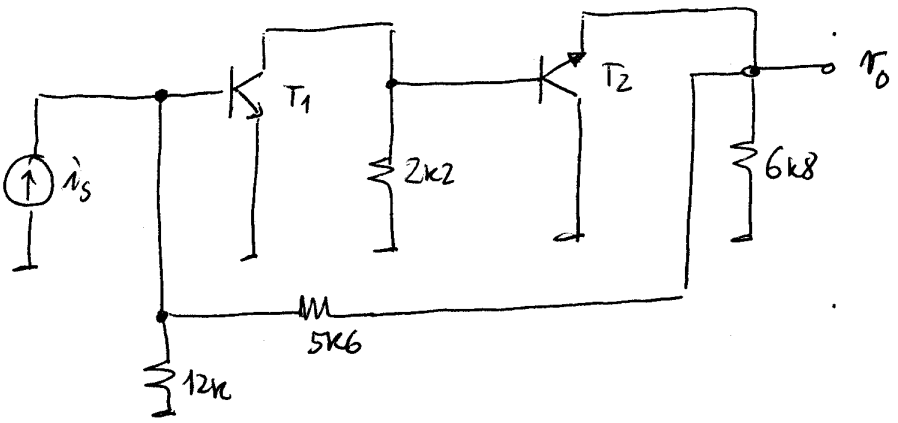
$I_1 = 2,12\ mA$

$V_{C1} = 7,33V$ $V_{C2} = 12V$

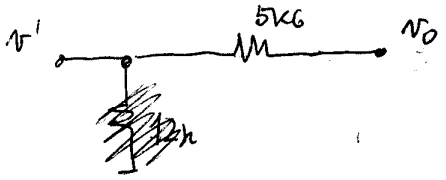
$V_{B1} = 0,7V$ $V_{B2} = 7,33V$

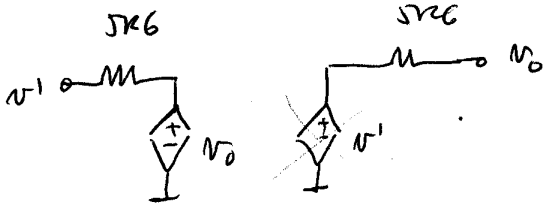
$V_{E1} = 0$ $V_{E2} = 6,63\ V$

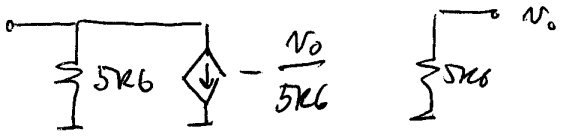
b)



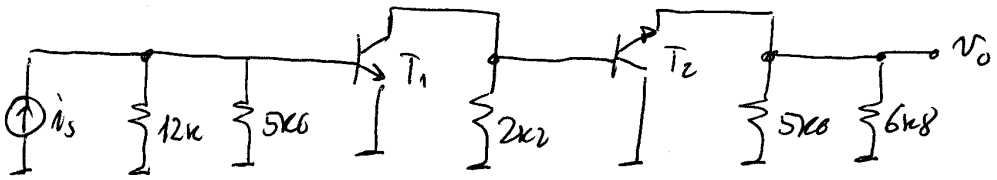
Tensão - paralelo





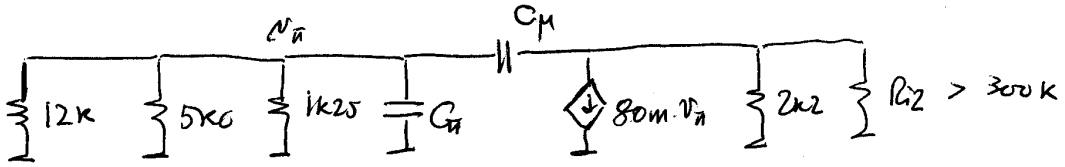


$\beta = -\frac{1}{5K6}$ A/V



c) T_2 é um CC pelo que tem resposta muito boa, i.e., a contribuição das suas capacidades é mt. pequena — uma está ligada à massa (C_μ) e a outra (C_π) tem reduzido efeito de Miller.

T_1 é um EC de elevado ganho logo há efeito de Miller (sobre a o nó da base) considerável.



$$K = -80m \times 2k2 = -176$$

$$C = C_\pi + 177\,C_\mu = 50p + 177p = 227\,pF$$

$$\tau = (12k \,//\, 5k6 \,//\, 1k25)\, 227p \cong 214\ ns$$

d) $\beta A = 30$

$A_2 \cong 1$ pois $A_2 = \dfrac{3k07}{1,5 + 3k07} \cong 1$, $R_{i2} > 300k$

$$A_1 = -80m \cdot 2k2\ (12k \,//\, 5k6 \,//\, 1k25) =$$

$$R_m \cong -165,7\ V/mA \quad ①$$

$$R_{mf} = \frac{R_m}{1+\beta R_m} = -\frac{165,7 \cdot 10^3}{31} = -5,35\ V/mA$$

$$R_o = 5k6 \,//\, 6k8 \,//\, \frac{2k2 + 1k25}{101} = 33,8\ \Omega$$

$$R_{of} = \frac{R_o}{1+\beta R_m} = 1,09\ \Omega$$