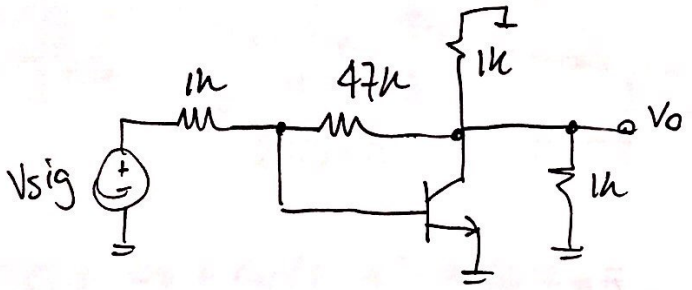
Resolução Ex 8 - CEA



$I_C = 540\mu A$

$\beta = 100$

$C_\pi = 10pF$

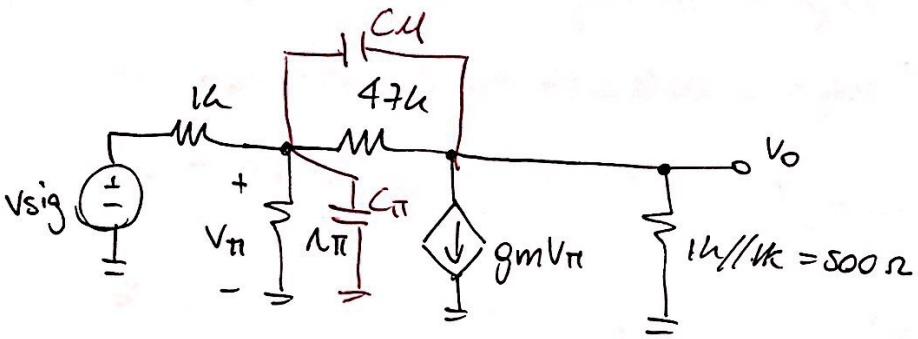
$C_\mu = 4pF$

→ Estimar ω_H

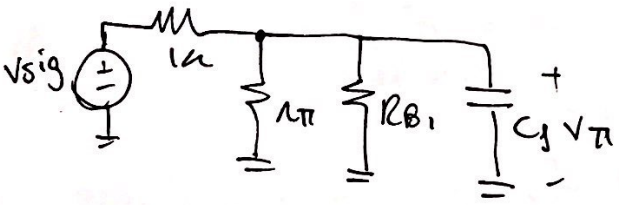
→ Pequenos sinais

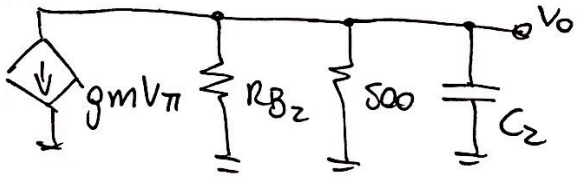
$g_m = \frac{I_C}{V_T} = 21,6 mA/V$

$r_\pi = \frac{V_T}{I_B} = 4,63 k\Omega$



→ Usando o teorema de miller:





$K = \frac{V_o}{V_\pi} \rightarrow R_{B_1} = \frac{R_B}{1-K}$ e $R_{B_2} = \frac{R_B}{1-1/K}$

$K = -g_m \cdot R_{B_2} // 500 = -g_m \frac{R_{B_2} 500}{R_{B_2} + 500} = -g_m \frac{R_B \cdot 500}{(1-1/K)500 + R_B}$

$(K-1)500 + K R_B = -g_m R_B \cdot 500$

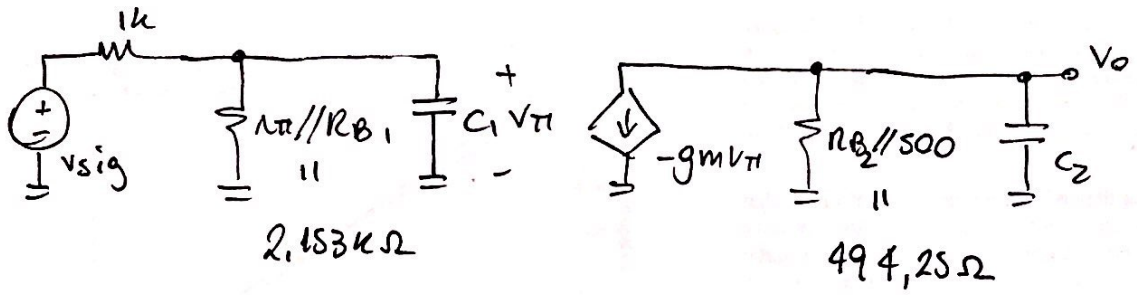
$K(500 + R_B) = -g_m R_B 500 + 500$

$K = \frac{-g_m R_B 500 + 500}{500 + R_B} = -10,676 V/V$

→ $R_{B_2} = 42,975 k\Omega$

→ $R_{B_1} = 4,025 k\Omega$

• Assim



$C_1 = C_\pi + C_\mu(1-k) = 56,7\,nF$

$C_2 = C_\mu(1-1/k) = 4,37\,pF$

$\rightarrow R_{C_1} = r_\pi // R_{B_1} // 1k = 682,8\,\Omega$

$R_{C_2} = R_{B_2} // 500 = 494,25\,\Omega$

$$\omega_H \cong \frac{1}{C_1R_{C_1} + C_2R_{C_2}} \cong \frac{1}{38,7\,ns + 2,16\,ns} = 25,83\,krad/s$$

$$f_H = \frac{\omega_H}{2\pi} = 4,11\,kHz$$