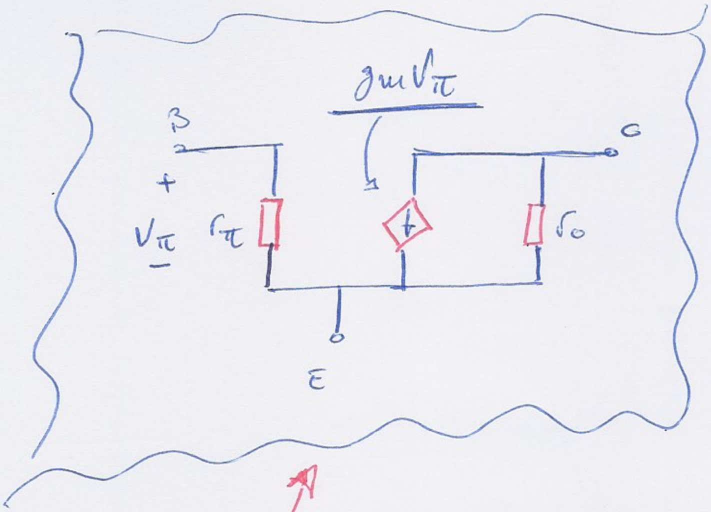
→ Transcondutância

Na saída ($\diamond \,\|\, \beta r_0$) → mas r_0 já foi linearizado com o efeito Early

$$g_m = \frac{\partial I_C}{\partial V_{BE}} = \frac{\partial}{V_{BE}}\left[I_S \exp\left(\frac{V_{BE}}{V_T}\right)\right]$$

$$g_m = \frac{1}{V_T} I_S \exp\left(\frac{V_{BE}}{V_T}\right)$$

$$g_m = \frac{I_C \big|_{V_{BE}=0}}{V_{Th}}$$



Modelo pequenos sinais.

EXEMPLO.

Suponha um transistor com

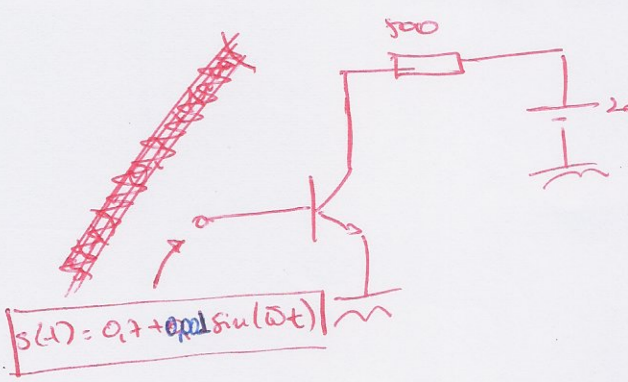
$I_S = 3,5 \times 10^{-14}$ A

$\beta = 100$

$V_A = \infty$

$V_{BE_0} = 700$ mV

e sinal senoidal de 1 mV de amplitude. Conectado como no circuito ao lado



Resol: ① Calculamos I_C

$$I_{C_0} = I_S \exp\left(\frac{V_{BE}}{V_T}\right) = 3,5 \times 10^{-14} \exp\left(\frac{0,7}{0,026}\right) \cong 19,85 \text{ mA}$$

$$I_{B_0} = \frac{I_{C_0}}{\beta} = \frac{19,85 \text{ mA}}{100} = 198,5 \,\mu\text{A}.$$