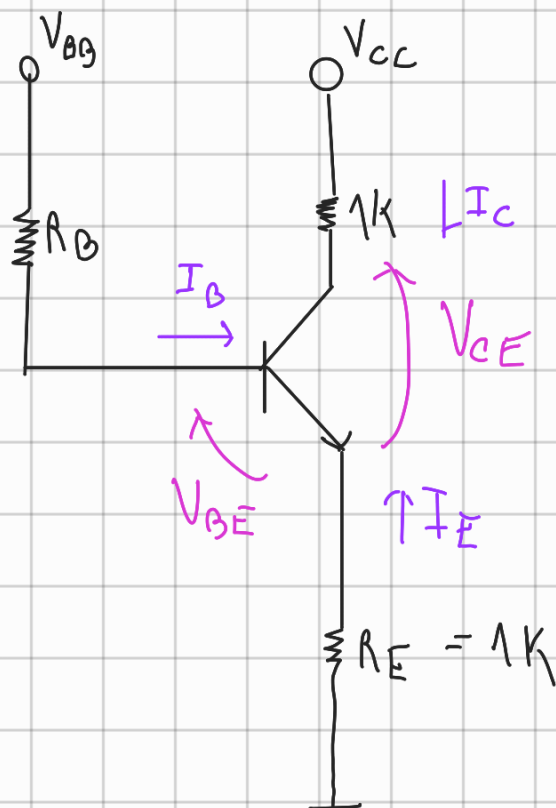


$$V_{BB} = 1,63V$$

$$R_B = 89k$$



$$I_E = -I_C$$

$$V_{BB} - I_B R_B - V_{BE} - I_C R_E = 0$$

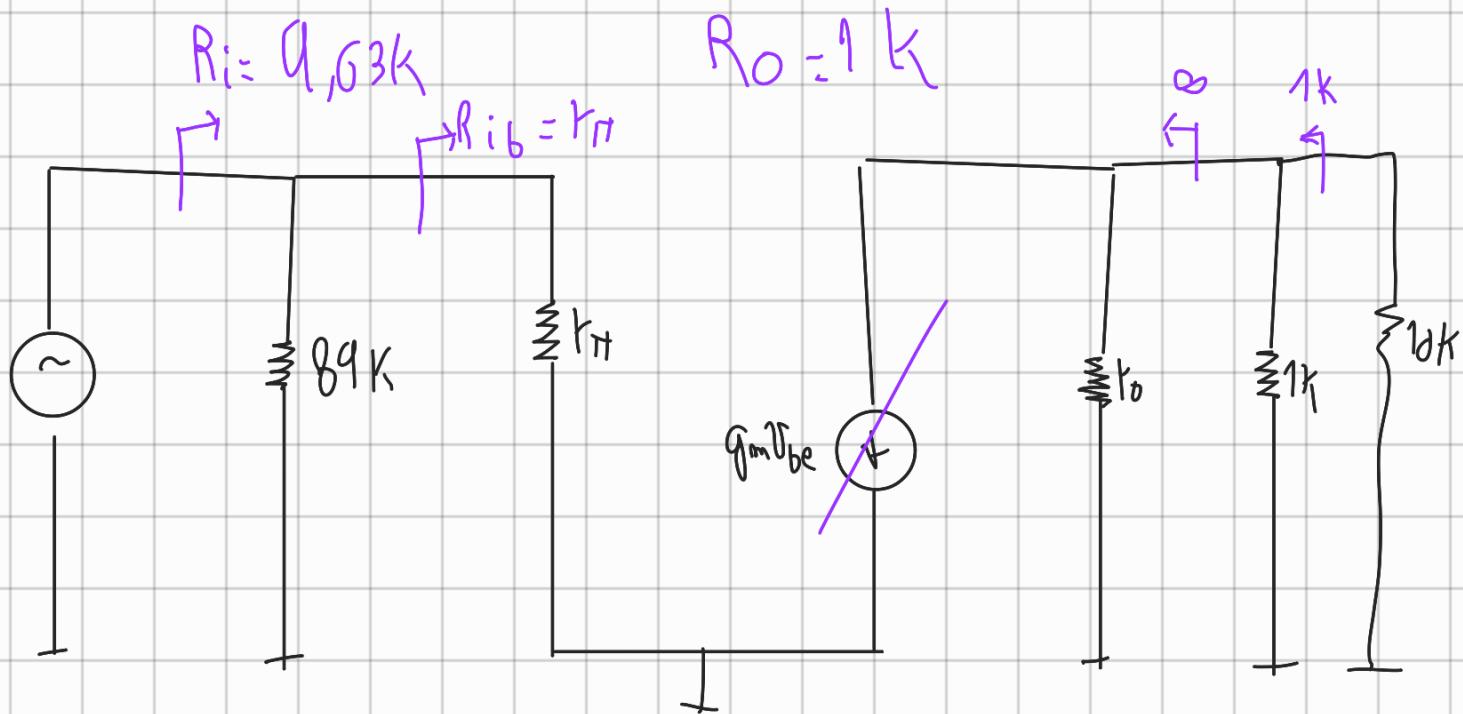
$$V_{CC} - I_C \cdot 1K - V_{CE} - I_C \cdot 1K = 0$$

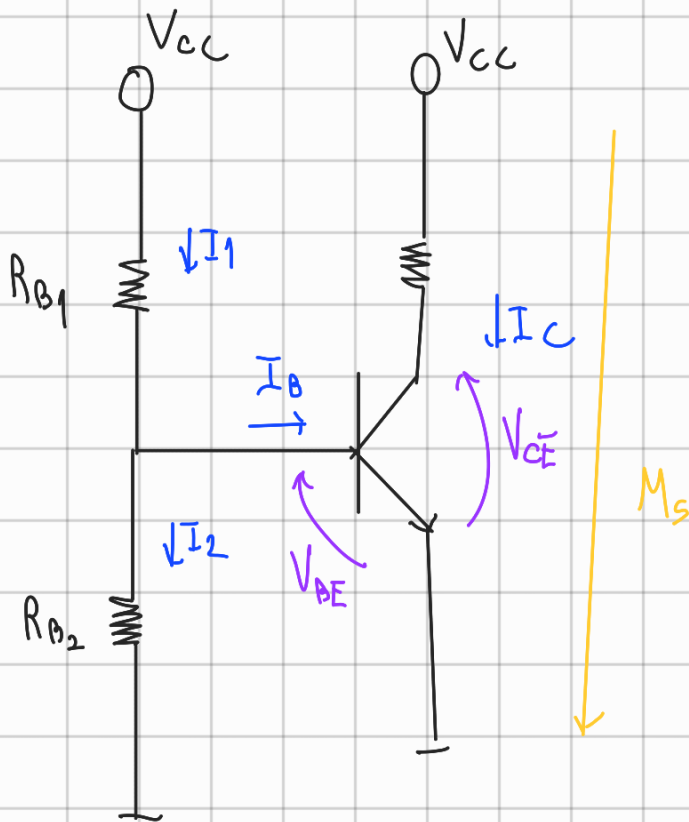
$$I_C \left( \frac{R_B}{\beta} + R_E \right) = V_{BB} - V_{BE} \rightarrow I_C = 0,7 \text{ mA}$$

$$V_{CE} = 13,6 \text{ V}$$

$$g_m = \frac{I_C}{V_T} = 0,027$$

$$r_{\pi} = \frac{\beta}{g_m} = 10,8 \text{ k}\Omega$$





$$\text{MAD} \rightarrow V_{BE} = 0,7V \longrightarrow I_2 = \frac{0,7V}{R_{B2}} = 3,5 \mu A$$

$$\longrightarrow I_1 = \frac{V_{CC} - 0,7V}{R_{B1}} = 46,5 \mu A$$

$$I_B = I_1 - I_2 = 46,5 \mu A - 3,5 \mu A = 43 \mu A$$

$$\text{MAD} \longrightarrow I_C = \beta I_B = 200 \cdot 43 \mu A = 8,6 \text{ mA}$$

$$(M_5) V_{CC} - I_C R_C - V_{CE} = 0 \longrightarrow V_{CE} = V_{CC} - I_C R_C = 5,7V$$