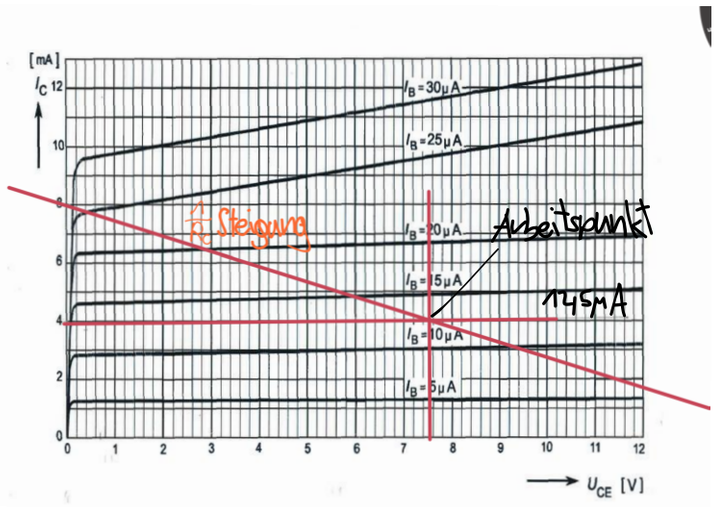
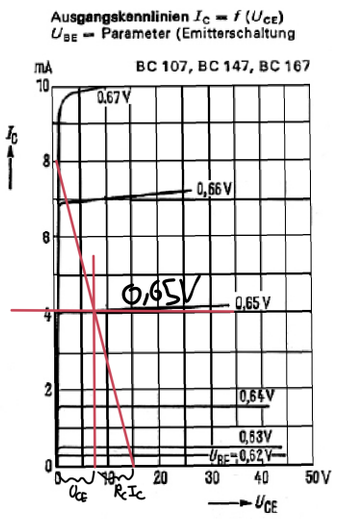




5) Basisruhepotential $i_D = 12{,}5\,mA$

$$V_B = U_{BE} + U_{RE} = 0{,}65V + (i_B + i_C)\cdot R_E$$
$$= 0{,}65V + 4{,}0125mA \cdot 44\Omega$$
$$= 0{,}65V + 0{,}18V$$
$$= \underline{0{,}83V}$$

6) Querstrom & Spannungsteiler

$$I_Q \overset{!}{:=} 6 \cdot I_B = 75\,\mu A$$

$$R_1 = \frac{U_B - V_B}{I_Q + I_B} \overset{E12}{=} 162\,k\Omega \Rightarrow 180\,k\Omega$$

$$R_2 = \frac{V_B}{I_Q} \overset{E12}{\Rightarrow} 11{,}1\,k\Omega \Rightarrow 12\,k\Omega$$

7) Eingangs- & Ausgangswiderstand

$$r_e = R_1 \| R_2 \| r_{BE} + \beta R_E = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{r_{BE} + \beta R_E}} = 654\Omega$$

$$r_a = R_C \| r_{CE} + R_E = \frac{1}{\frac{1}{R_C} + \frac{1}{r_{CE} + R_E}} = 1741\,\Omega$$

$\frac{1}{48}$ mA

8)

$f_{min} = f_g \sqrt{n}$ n # Hochpässe $C_e C_E C_a$

$f = f_{min}/\sqrt{3} = 100/\sqrt{3}$ Hz

$Re(Z) = Im(Z)$

$f_g = \frac{1}{2\pi X_C C}$

Angabe:

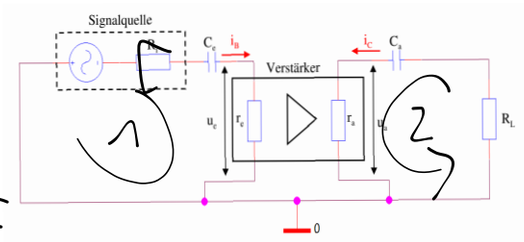
1) $\Rightarrow X_C = R_i + r_e$

$$C_e = \frac{\sqrt{3}}{2\pi f_{min}(R_i + r_e)} = 385\,nF$$

Analog

2) $\Rightarrow X_C = R_L + r_a$

$$C_a = \frac{\sqrt{3}}{2\pi f_{min}(R_L + r_a)} = 700\,nF$$

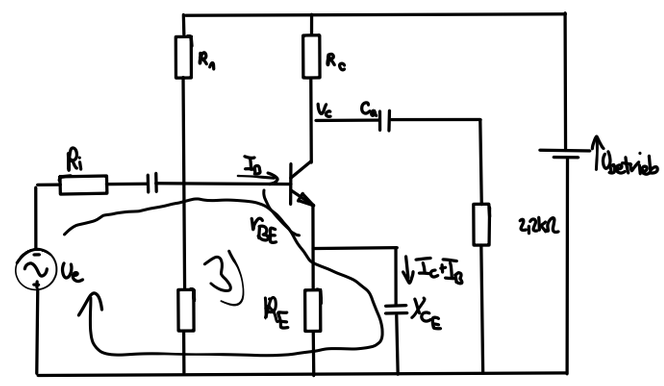


3) $\Rightarrow$

$$|U_e| = |U_{Ri} + U_{BE} + i\,U_{CE}| \quad i_B + i_C \approx i_C$$
$$= i_B \sqrt{(R_i + r_{BE})^2 + (\beta X_{CE})^2}$$

$$\frac{R_i + r_{BE}}{\beta} = X_{CE}$$

$$C_E = \frac{\sqrt{3}\,\beta}{2\pi f_{min}(R_i + r_{BE})} = 322\,\mu F$$

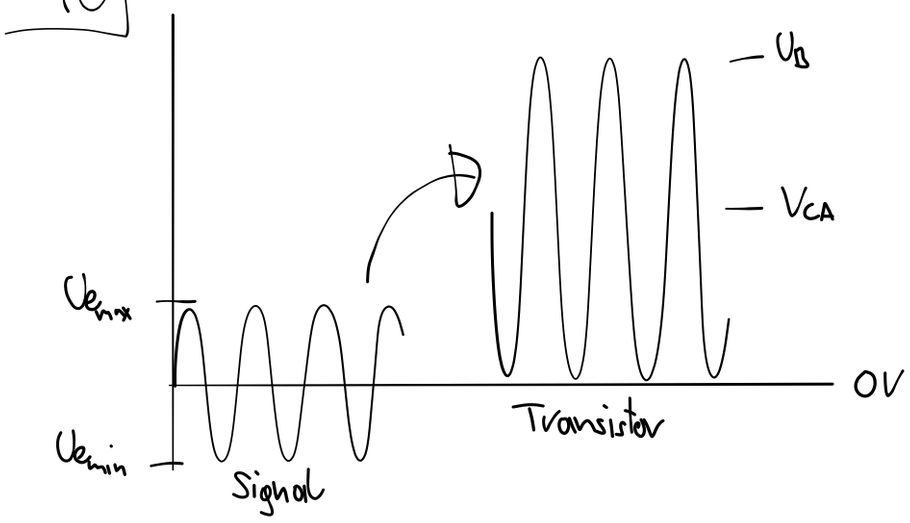


9) Verstärkung mit Überbrückungskondensator

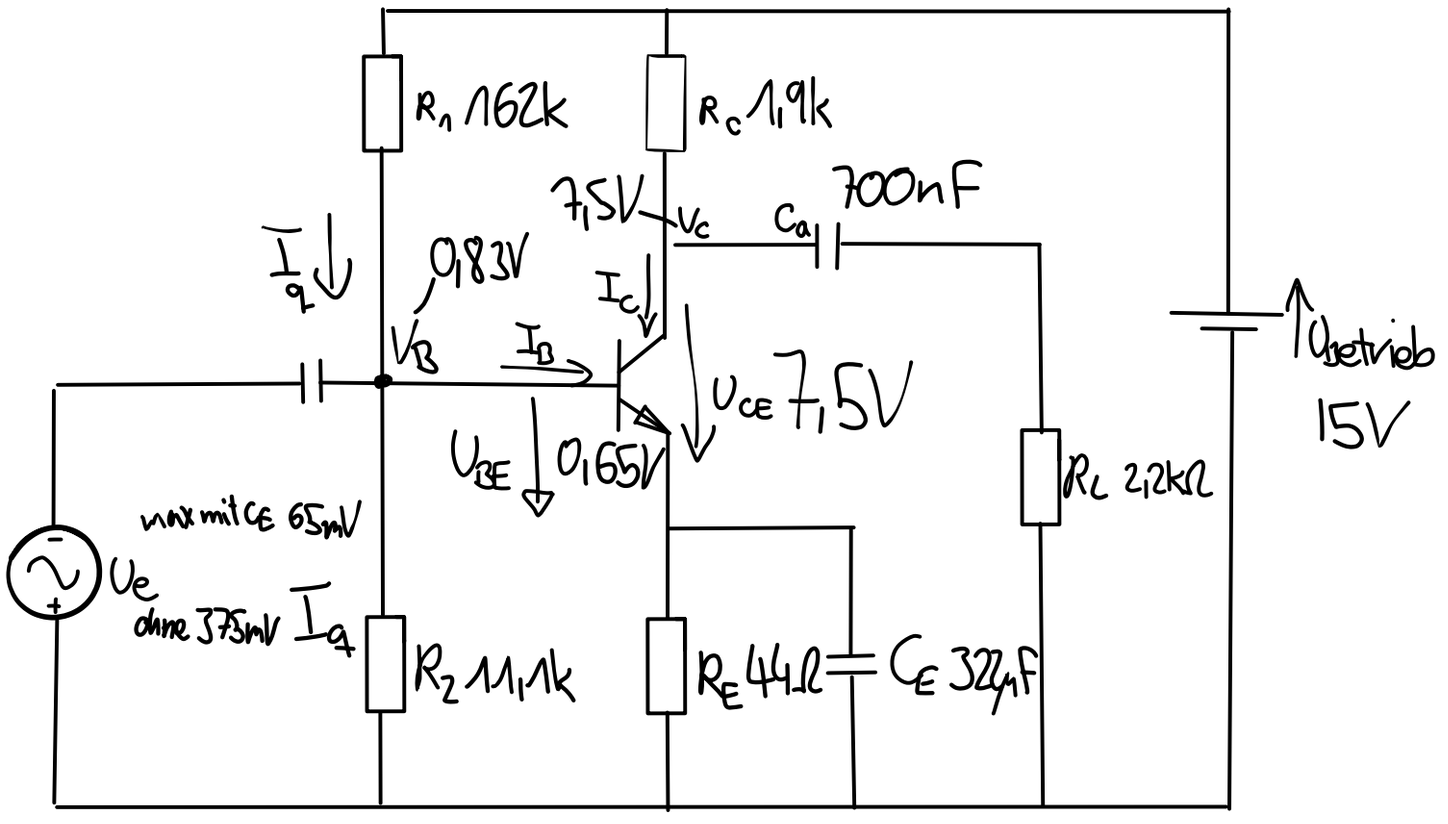
$$V_{u,CE} = \frac{U_a}{U_e} = \frac{i_c (r_a \| R_L)}{i_b r_{BE} + (i_b + i_c)(R_E \| X_{CE})}$$
$$= \frac{\beta (r_a \| R_L)}{r_{BE} + \beta (R_E \| X_{CE})} = 117$$

$$X_{CE} = \frac{R_i + r_{BE}}{\beta}$$

10)



$\Rightarrow |U_{emax}| = |U_{emin}| = \frac{U_B}{2V}$ wobei V Verstärkung

$$U_{emax} = \frac{U_B}{2 V_{u,CE}} = 64\,mV \text{ mit } C_E$$

$$U_{emax} = \frac{U_B}{2 V_u} = 375\,mV \text{ ohne } C_E$$