

① $U_C(0) \cong \sqrt{2} \cdot 230 = 325 \text{ V}$

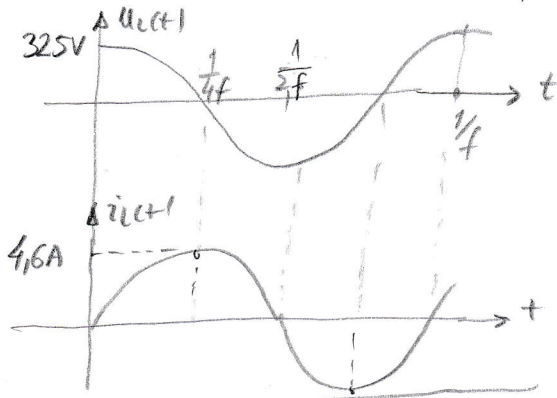
TE-20200212

$$u_L(t) = U_C(0) \cdot \cos \omega t ; f = \frac{1}{2\pi \sqrt{10 \cdot 10^{-6} \cdot 50 \cdot 10^{-3}}} = 225 \text{ Hz} ; \frac{1}{f} = T = 4,44 \text{ ms}$$

$$\omega = 2\pi f = 1414 \text{ rad/s}$$

$$u_L(t) = 325 \cos 1414 t \text{ [V]}$$

$$u_L(t) = L \cdot \frac{di_L}{dt} \Rightarrow i_L = \frac{1}{L} \int u_L(t) dt \Rightarrow i_L = \frac{1}{L} \int 325 \cdot \cos 1414 t$$



$$i_L = \frac{325}{1414 \cdot 50 \cdot 10^{-3}} \cdot \sin 1414 t = 4,6 \cdot \sin 1414 t \text{ [A]}$$

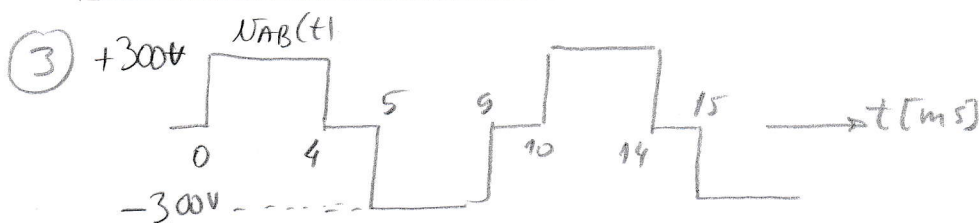
② $P_{I \max} = 12 \text{ V} \cdot 10 \text{ A} = 120 \text{ W}$

$$P_o = V_o \cdot I_o ; R = V_o / I_o ; V_o = \frac{1}{1-D} V_I ; I_o = (1-D) I_I$$

$$P_o = 120 \text{ W} = V_o I_o = \frac{V_o^2}{R} = \frac{V_I^2}{(1-D)^2} \cdot \frac{1}{R} \Rightarrow 120 = \frac{12^2}{(1-D)^2} \cdot \frac{1}{30}$$

$$(1-D)^2 = \frac{12^2}{120 \cdot 30} = 0,04 \Rightarrow 1-D = 0,2 \Rightarrow \underline{D = 0,8}$$

$$V_o = \frac{1}{1-0,8} \cdot 12 = \underline{60 \text{ V}} ; I_o = \frac{V_o}{R} = \frac{60}{30} = \underline{2 \text{ A}}$$



$$V_{AB \text{ eff}} = \sqrt{\frac{1}{T} \int_0^T u_{AB}^2(t) dt} = \sqrt{\frac{1}{10 \cdot 10^{-3}} (4 \cdot 10^{-3} \cdot 300^2 + 4 \cdot 10^{-3} \cdot 300^2)}$$

$$V_{AB \text{ eff}} = 268 \text{ V}$$

$$P = \frac{V_{AB \text{ eff}}^2}{R} \Rightarrow R = \frac{V_{AB \text{ eff}}^2}{P} = \frac{268^2}{400} = \underline{179,6 \Omega}$$