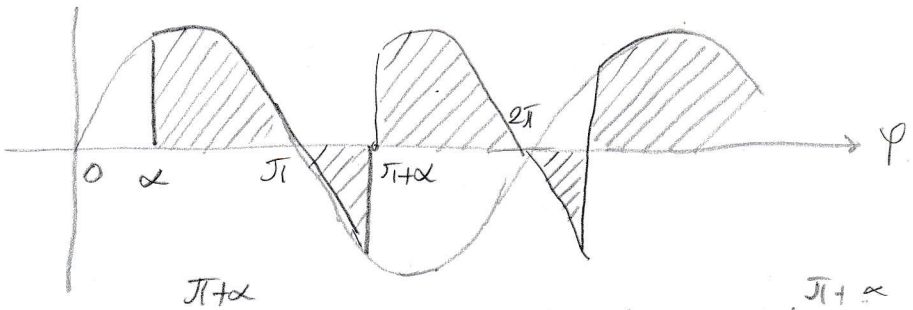
EE-20200129

① 

$$U_M = \frac{1}{\pi}\int_{\alpha}^{\pi+\alpha} U_m \sin\varphi\, d\varphi = \frac{U_m}{\pi}\left(-\cos\varphi\right)\Big|_{\alpha}^{\pi+\alpha} = \frac{U_m}{\pi}\left(\cos\alpha - \cos(\pi+\alpha)\right)$$

$$U_M = \frac{U_m}{\pi}\, 2\cdot\cos\alpha$$

$$U_{M1} = 50V = \frac{2U_m}{\pi}\cos\alpha_1 \Rightarrow \alpha_1 = \arccos\frac{50\pi}{2U_m} = \arccos\frac{50\pi}{2\sqrt{2}\cdot 230} = 76°$$

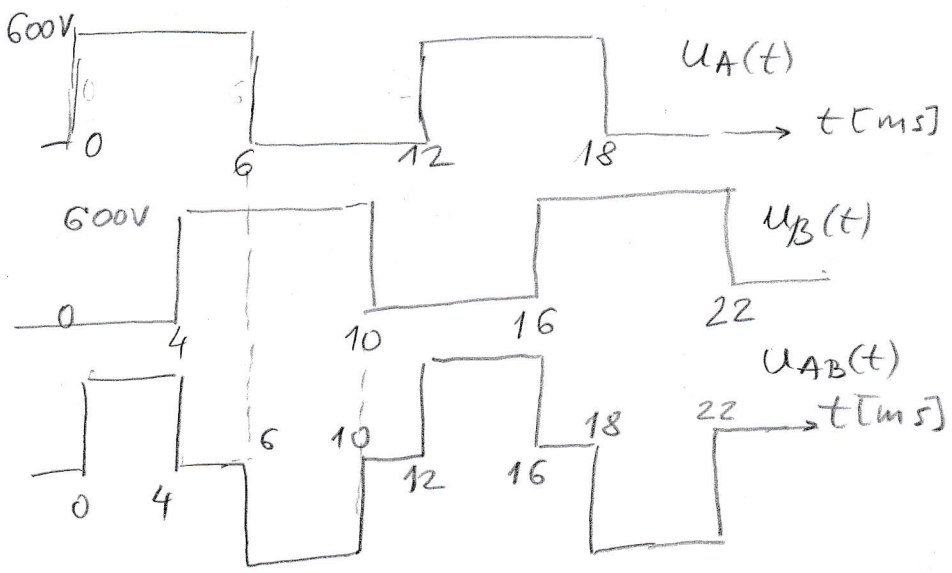
$$U_{M2} = 150V = \frac{2U_m}{\pi}\cos\alpha_2 \Rightarrow \alpha_2 = \arccos\frac{150\pi}{2U_m} = \arccos\frac{150\pi}{2\sqrt{2}\cdot 230} = 43{,}6°$$

② $U_o = D\,U_I$; $20V < U_I < 30V$; $D_{max} = 0{,}9$

$U_o \geq n\cdot 4{,}2V$; $18V < U_o < 27V$

$n \leq \frac{U_o}{4{,}2V}$; $n_{max} \leq \frac{U_{omin}}{4{,}2V} = 4{,}28$;

$n_{max} = 4$

③ 

$$P = \frac{1}{T}\int_0^T \frac{u_{AB}^2(t)}{R} = \frac{1}{RT}\left(600^2\cdot 4\cdot 10^{-3} + 600^2\cdot 4\cdot 10^{-3}\right)$$

$$P = \frac{600^2}{100\cdot 12\cdot 10^{-3}}\cdot 8\cdot 10^{-3} = 2400W.$$