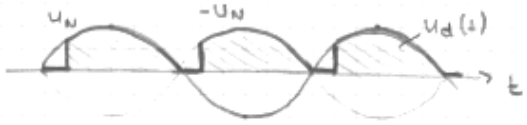
Übung 6: Gleichrichter

1. → Skript

2. $U_{di\alpha} = U_{di0} \frac{1+\cos\alpha}{2}$ $\quad U_{di0} = \frac{2}{\pi}\sqrt{2}\,U_{Netz} = 207\,V$

$\underline{U_{di\alpha}} = U_{di0} \frac{1+\cos 30°}{2} = \underline{193,2\,V}$

3. 

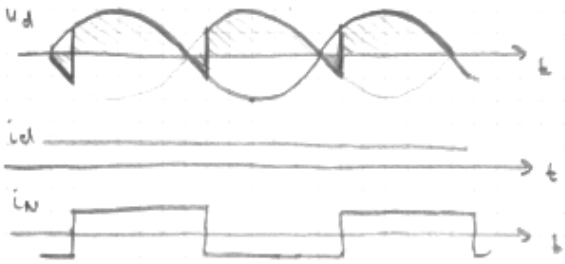
4. $i_J \sim u_J$

5. $\hat{I} = \frac{\hat{U}}{R} = \frac{\sqrt{2}\,U}{R} = \frac{\sqrt{2}\,230\,V}{50\,\Omega} = 6,5\,A$

$\underline{I_{eff}} = \sqrt{\frac{1}{T}\int i^2\,dt} = \sqrt{\frac{1}{\pi}\int_\alpha^\pi \hat{I}^2 \sin^2\vartheta\,d\vartheta} = \sqrt{\frac{1}{\pi}\hat{I}^2 \left|\frac{1}{2}(\vartheta - \sin\vartheta\cos\vartheta)\right|_\alpha^\pi}$

$= \sqrt{\frac{1}{\pi}\hat{I}^2\frac{1}{2}\left(\pi - \alpha - \underbrace{\sin\pi\cos\pi}_{0} + \sin\alpha\cos\alpha\right)}$

$= \sqrt{\frac{1}{\pi}\hat{I}^2\frac{1}{2}\left(\pi - \frac{30°}{180°}\pi + \sin 30°\cos 30°\right)} = \underline{4,5\,A}$

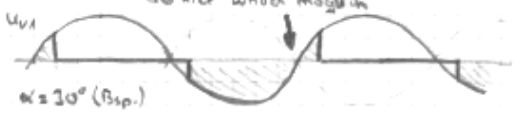
6. 

9. $\underline{\bar{U}_J} = U_{di\alpha} = U_{di0}\cos\alpha = \frac{2}{\pi}\sqrt{2}\,U_N \cos 30° = \underline{179,3\,V}$

10. $\underline{I_J} = \frac{U_{di\alpha}}{R} = \underline{3,6\,A}$ $\quad$ 11. $\underline{I_{dmax}} = \frac{U_{di0}}{R} = \underline{4,14\,A}$ (bei $\alpha = 0°$)

12. $\underline{P_R} = R \cdot I_{eff}^2 = R\,I_{dmax}^2 = \underline{857\,W}$ $\quad (= U_{di0} \cdot I_{dmax})$

13. $\underline{I_{netz}} = I_J = I_{dmax} = \underline{4,14\,A}$ $\quad$ 14. $\underline{S_{Trafo}} = U_{eff} \cdot I_{eff} = \underline{952\,VA}$

15. 

$U_{max} = \sqrt{2}\,U_N$

$U_{Thyr} = 2,2 \cdot \sqrt{2}\,U_N = \underline{716\,V}$