# Leistungelektronik

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# Allgemein

$$i_L(t) = \frac{1}{L} \int u_L(t)dt$$
  $u_L(t) = L \frac{di_L(t)}{dt}$ 

# Tiefsetzsteller

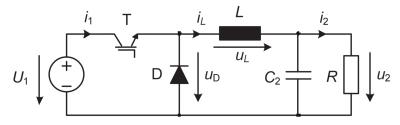


Figure 1: Tiefsetzsteller

### Kontinuierlicher Stromfluss

$$D3 = \frac{I_1}{I_2} = \frac{U_2}{U_1} \qquad \Delta i_{Lpp} = \frac{U_2}{L} (1 - D) T_S \quad \Delta u_{2pp} = \Delta U_C = \frac{U_2}{L} (1 - D) T_S \frac{T_S}{8 \cdot C}$$

### Diskontinuierlicher Stromfluss

$$I_{2g} = \frac{1}{2}\Delta i_{Lpp} = \frac{U_2}{2 \cdot L} (1 - D)T_S \qquad R_g = \frac{2L}{(1 - D) \cdot T_S} \qquad U_2 = U_1 \frac{D_1}{D_1 + D_2}$$

$$I_{2g,max} = I_{2g}|_{D=0.5} = \frac{U_1 T_S}{8L} \qquad \frac{U_2}{U_1} = \frac{D^2}{D^2 + \frac{1}{4} \frac{I_2}{I_{2g,max}}} \qquad D = \frac{1}{2} \sqrt{\frac{I_2/I_{2g,max}}{U_1/U_2 - 1}}$$

# Hochsetzsteller

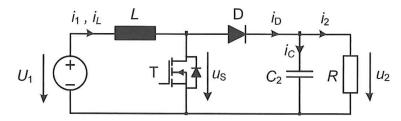


Figure 2: Hochsetzsteller

### Kontinuierlicher Stromfluss

$$D=1-\frac{U_1}{U_2} \qquad \qquad \frac{I_2}{I_1}=1-D \qquad \qquad \Delta U_{2pp}=\frac{U_2}{R}\frac{DT_s}{C_2}$$

### Diskontinuierlicher Stromfluss

$$I_{Lg} = \frac{1}{2} \frac{(U_2 - U_1)}{L} (1 - D) T_s \qquad I_{1g} = \frac{1}{2} \frac{U_2}{L} D (1 - D) T_s \qquad I_{2g,max} = I_{2g}|_{D=1/3} = \frac{2}{27} \frac{U_2}{L} T_S$$

$$D = \sqrt{\frac{4}{27} \frac{U_2}{U_1} \left(\frac{U_2}{U_1} - 1\right) \frac{I_2}{I_{2g,max}}}$$

# Tief-Hochsetzsteller

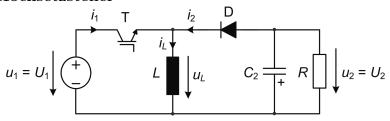


Figure 3: Tief-Hochsetzsteller

### Kontinuierlicher Stromfluss

$$\frac{U_2}{U_1} = -\frac{D}{1-D}$$
  $\frac{I_2}{I_1} = \frac{1-D}{D}$ 

### Diskontinuierlicher Stromfluss

$$I_{Lg} = \frac{1}{2} \frac{-U_2}{L} (1 - D) T_s \qquad I_{2g} = \frac{1}{2} \frac{-U_2}{L} (1 - D)^2 T_s \qquad I_{2g,max} = -\frac{1}{2} \frac{U_2}{L} T_s$$

$$D = -\frac{U_2}{U_1} \sqrt{\frac{I_2}{I_{2g,max}}}$$

# PFC Einphasen Gleichrichter

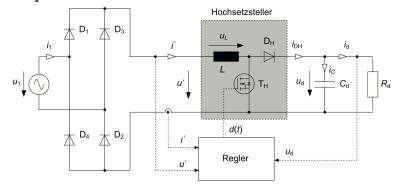


Figure 4: PFC Einphasen Gleichrichter

# Toleranzbandregelung

$$i'_{max} = (1+k)i'^* \qquad \quad i'_{min} = (1-k)i'^* \qquad \Delta i_{pp} = 2k \cdot \hat{i}'^* |sin(\omega t)|$$

# Netzgefhrte Stromrichter Text Induktivitt Dimensionierung Text Trafo Dimensionierung Text Sperrwandler Text Durchflusswandler Text Einphasen Gleichspannungswechselrichter Text

Dreiphasen Gleichspannungswechselrichter

Text