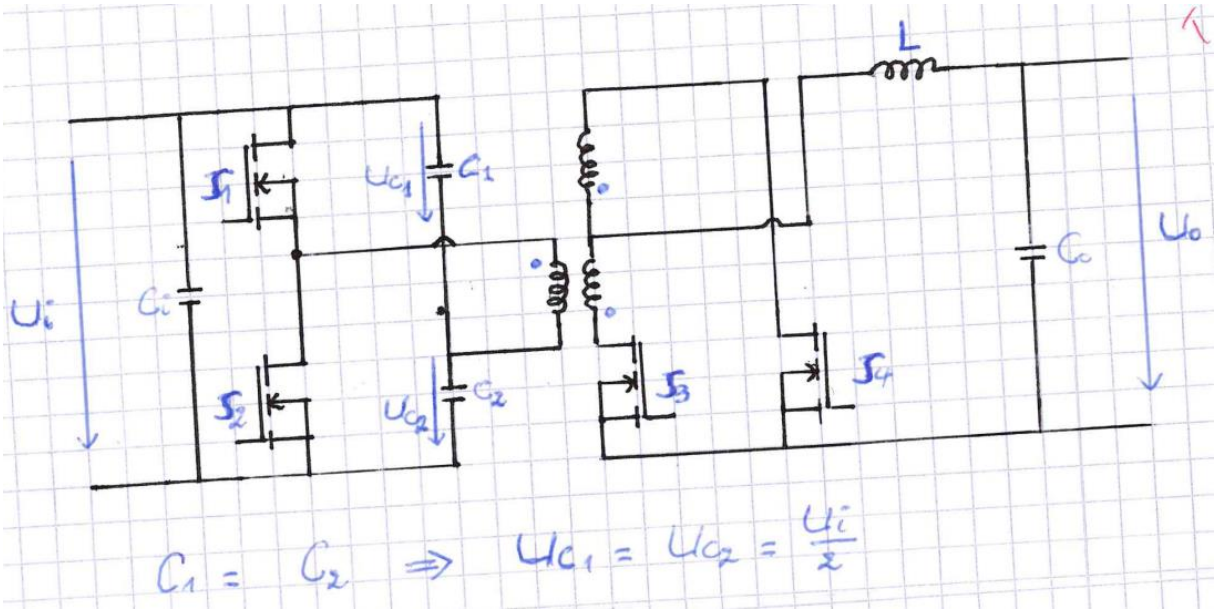
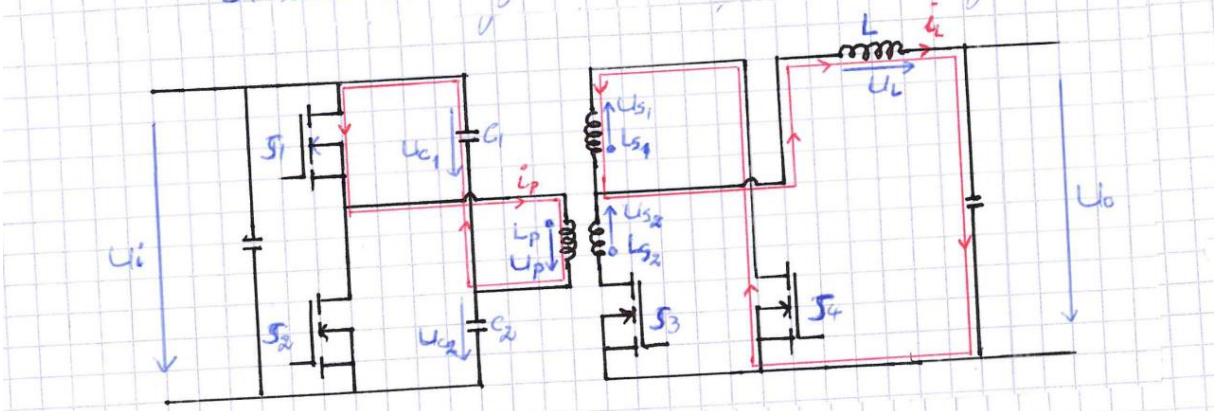


$$C_1 = C_2 \Rightarrow U_{C_1} = U_{C_2} = \frac{U_i}{2}$$

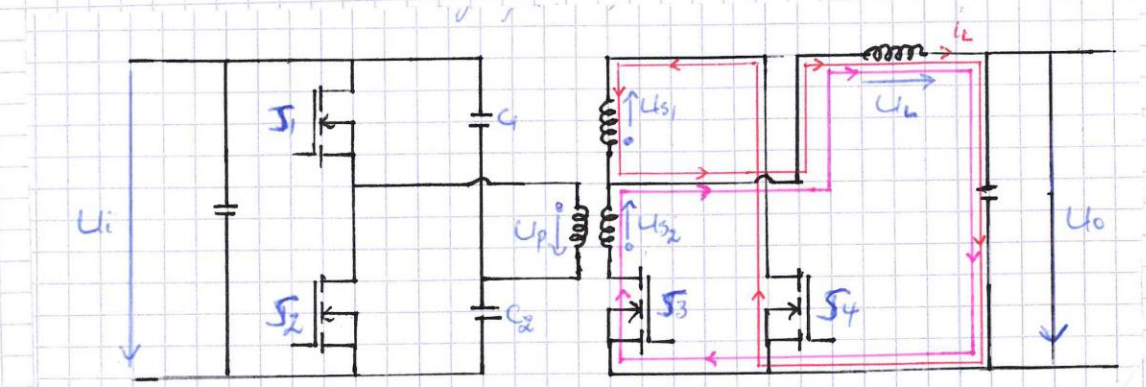
Phase 1: $0 \leq t < T_1$

S_1 und S_4 eingeschalten; T_2 und T_4 gesperrt:



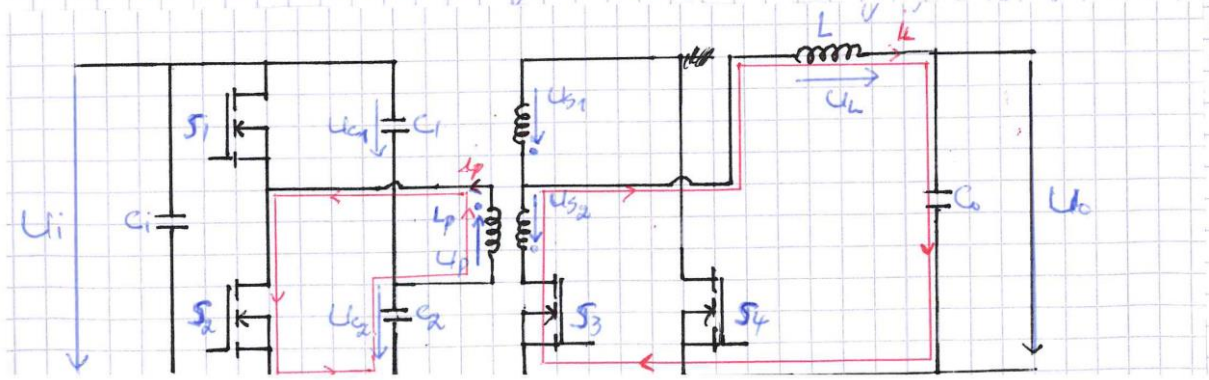
Phase 2 : $T_1 \leq t < T_2$

S_1 und S_2 sind gesperrt; S_3 und S_4 sind geschlossen

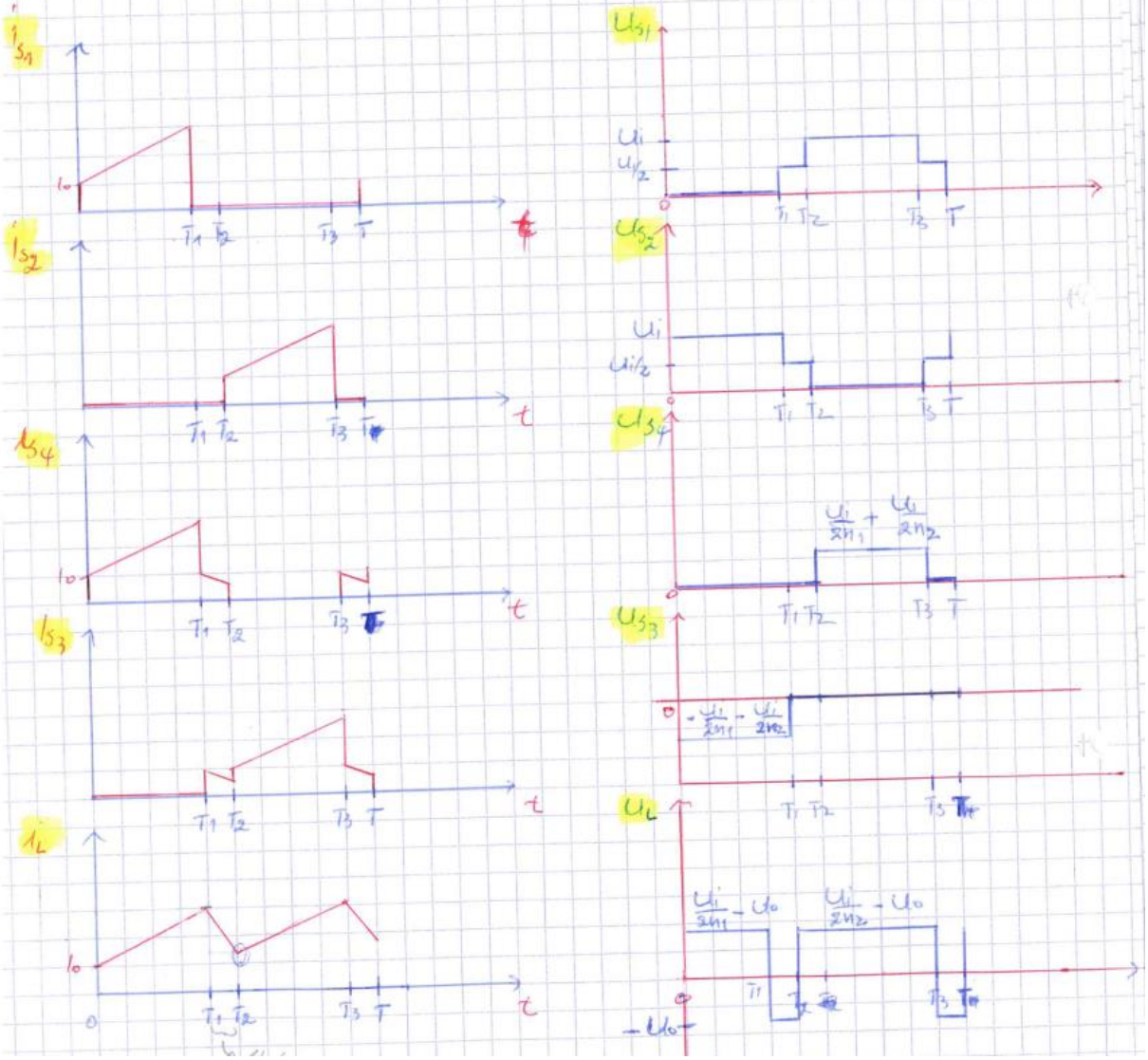


Phase 3 : $T_2 \leq t < T_3$

T_2 und T_3 sind eingeschalten; T_1 und T_p sind gesperrt.



Phase 4: $T_3 \leq t < T$: gleich wie die Phase 2:



Spannungszeitfläche:

$$2\left(\frac{U_i}{2n_1} - U_0\right) T_1 - 2U_0 (T_2 - T_1) = 0 \qquad \text{, weil } n_1 = n_2$$

$$\Rightarrow \frac{U_i}{2n_1} T_1 - U_0 T_1 = U_0 T_2 + U_0 T_1 = 0$$

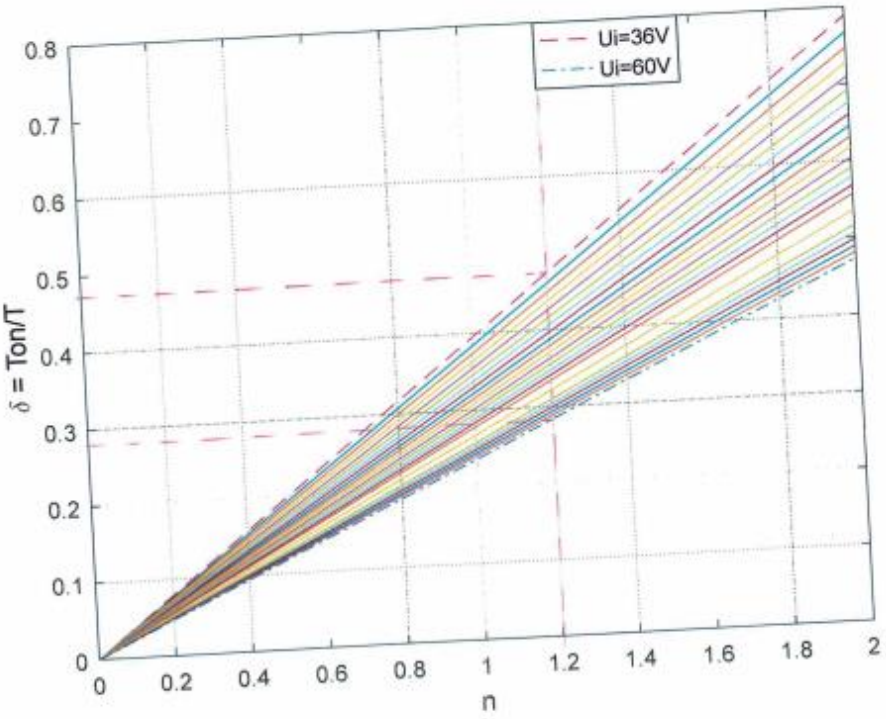
$$\Rightarrow U_0 = \frac{U_i}{2n_1} \times \frac{T_1}{T_2} = \frac{U_i}{2n_1} \times \frac{T_1}{\frac{T}{2}}$$

$$U_0 = \frac{U_i}{n_1} \times \frac{T_1}{T}$$

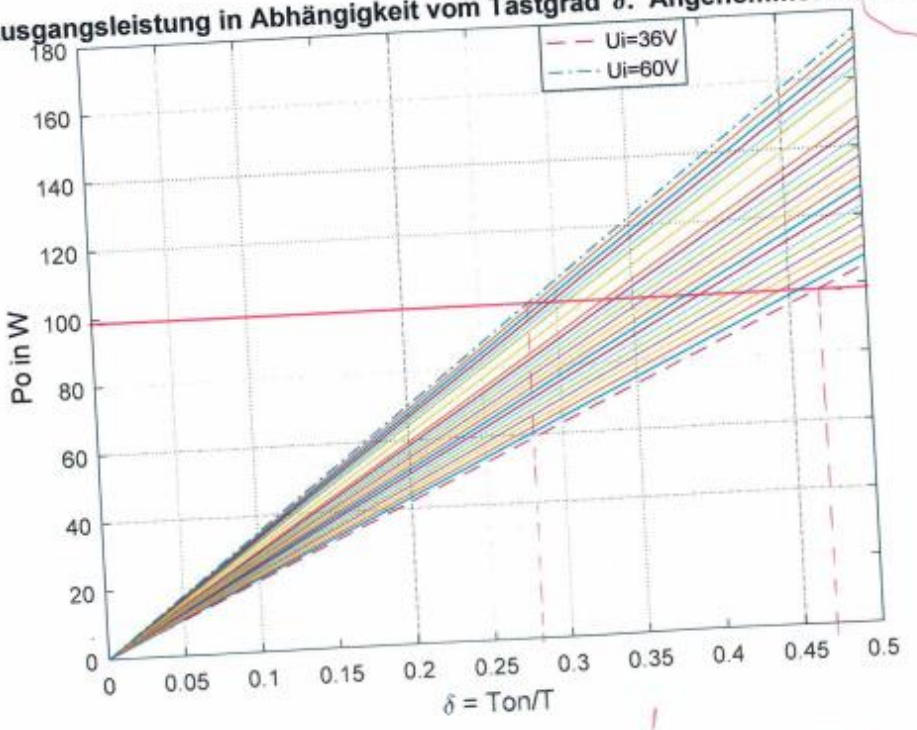
$$\Rightarrow U_0 = \frac{U_i}{2n_1} \times \frac{T_1}{\frac{T}{2}} = \frac{U_i}{n_1} \times \frac{T_1}{T}$$

$$\boxed{U_0 = \frac{U_i}{n_1} \delta} \quad ; \quad \delta = \frac{T_1}{T} \qquad [0 \le \delta \le 0{,}5]$$

$U_o = \frac{U_i}{n} \delta \Rightarrow \delta = \frac{U_o}{U_i} n$! < 0,5



Ausgangsleistung in Abhängigkeit vom Tastgrad δ. Angenommen ist n=1.2



$P_o = U_o I_o = \frac{U_i}{n} I_o \delta \doteq$! 99,4 W

$$P_o = \frac{1}{T}\int_0^T P_o(t)\,dt$$

$$= \frac{2}{T}\int_0^{\frac{T}{2}} P_o(t)\,dt = \frac{2}{T}\int_0^{\frac{T}{2}} U_o\, i_L(t)\,dt$$

$$= \frac{2}{T}\cdot\frac{T_2 \times I_{Lmax}}{2}\cdot U_o$$

$$= \frac{2}{T}\,\frac{T_2\,(I_o + I_{Lmax})}{2}\,U_o$$

$I_o = 0$ (im BCM) ; $T_2 = \frac{T}{2}$

$$\Rightarrow P_o = \frac{I_{Lmax}\cdot U_o}{2} = \frac{\frac{1}{L}\left(\frac{U_i}{2n} - U_o\right)T_1\,U_o}{2}$$

$$= \frac{1}{2L}\left(\frac{U_i}{2n} - U_o\right)\delta T\,U_o$$

$$\boxed{P_o = \frac{1}{2 f_s L}\left(\frac{U_i}{2n} - U_o\right)\delta\,U_o}$$ Möglichkeit 1

$$U_o = \frac{U_i}{n}\,\delta$$

$$\boxed{P_o = U_o I_o = \frac{U_i}{n}\,\delta\,I_o}$$ Möglichkeit 2

$$P_o = P_o \Leftrightarrow \frac{1}{2 f_s L}\left(\frac{U_i}{2n} - U_o\right)\delta U_o = \frac{U_i}{n}\,\delta I_o$$

$$\Rightarrow 2 f_s L\left(\frac{2n}{U_i - 2nU_o}\right)\cdot\frac{1}{U_o} = \frac{n}{U_i I_o}$$

$$\Rightarrow L = \frac{n}{U_i I_o}\,U_o\left(\frac{U_i - 2nU_o}{2n}\right)\frac{1}{2 f_s}$$

$$\Rightarrow \boxed{L = \frac{U_o}{2 f_s U_i I_o}\left(\frac{U_i - 2nU_o}{2}\right)}$$