Exercise 1

A flyback converter is working in the incomplete demagnetization area with the control ratio $D = 0,4$. To realize this setting, two flyback converters can also be connected in parallel like in the figure 1 to reduce the power in each converter.
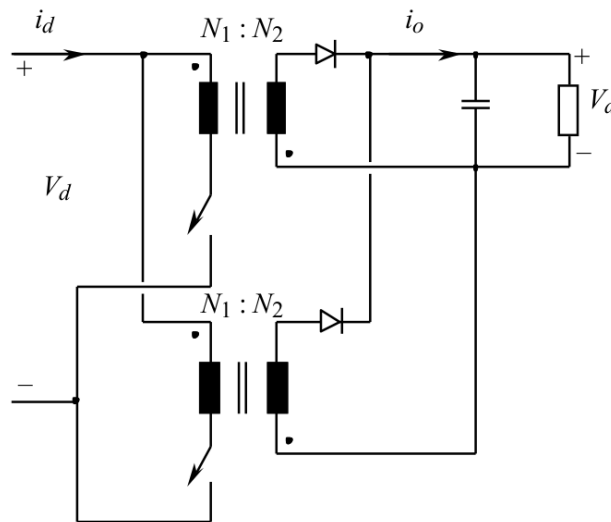

Figure 1: Two Flyback-converters connected in parallel.

Compare the input current i_d and output current i_o in the two possibilities when the output voltage is considered as constant. What are the current peak values in both cases when the transformer ratio $N_1 : N_2 = 1$? The parallel flyback converters are controlled with a π delay with the other one.
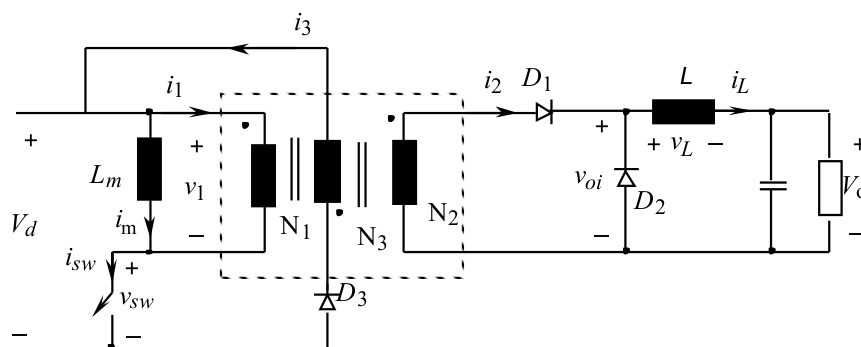
Exercise 2

Figure 2: Forward-converter.

The characteristics of the Forward-converter of figure 2 are as followed:
$V_d = 48V \pm 10\%$, $V_o = 5V$, $f_s = 100$kHz, the power in the load P_o varies between 15W and 50W. The demagnetization winding number of turn is $N_3 = N_1$.

   a) Calculate the minimal value of the ratio N_2/N_1 allowed.

b) Calculate the inductance of the choke L that keeps the converter working in continuous conduction mode (CCM).

Exercise 3

Using the results of the previous exercise, calculate the RMS-value of the current in the inductance I_L when $V_d = 48\text{V}$, $N_2/N_1 = 1/4$, the output power $P_o = 50\text{W}$ and the inductance is $L = 20,68\mu\text{H}$.