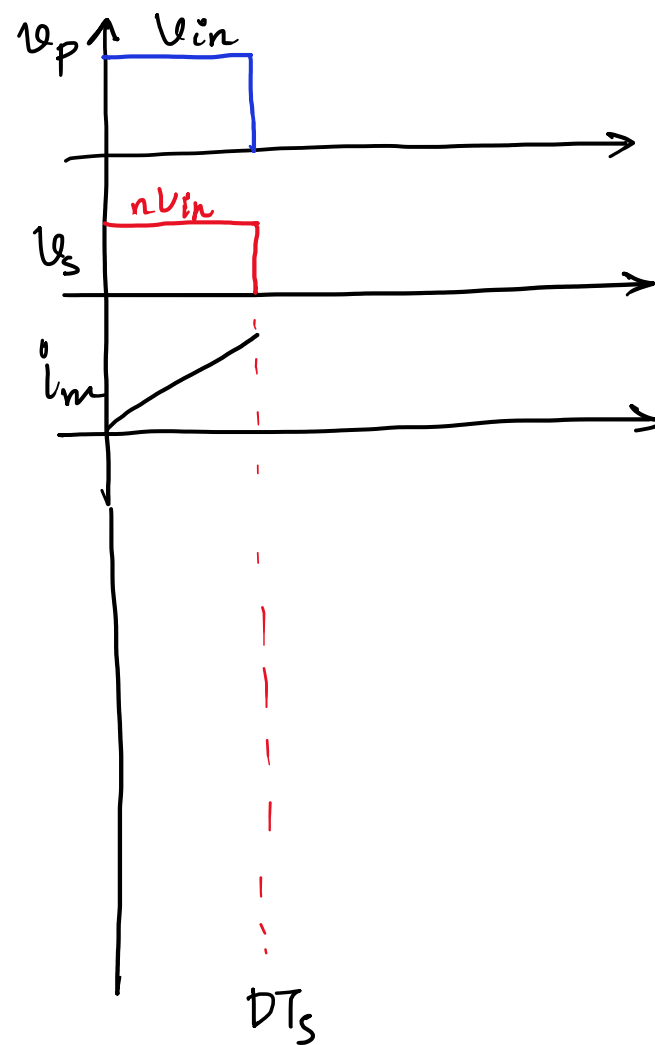
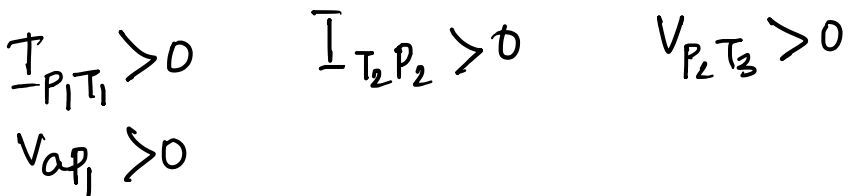


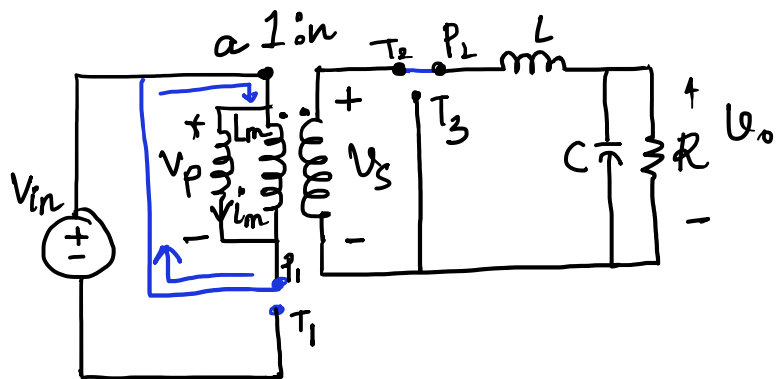
Switched Mode Power Conversion

Semester II Academic Year 2025-26

Lecture 25

24th March 2026

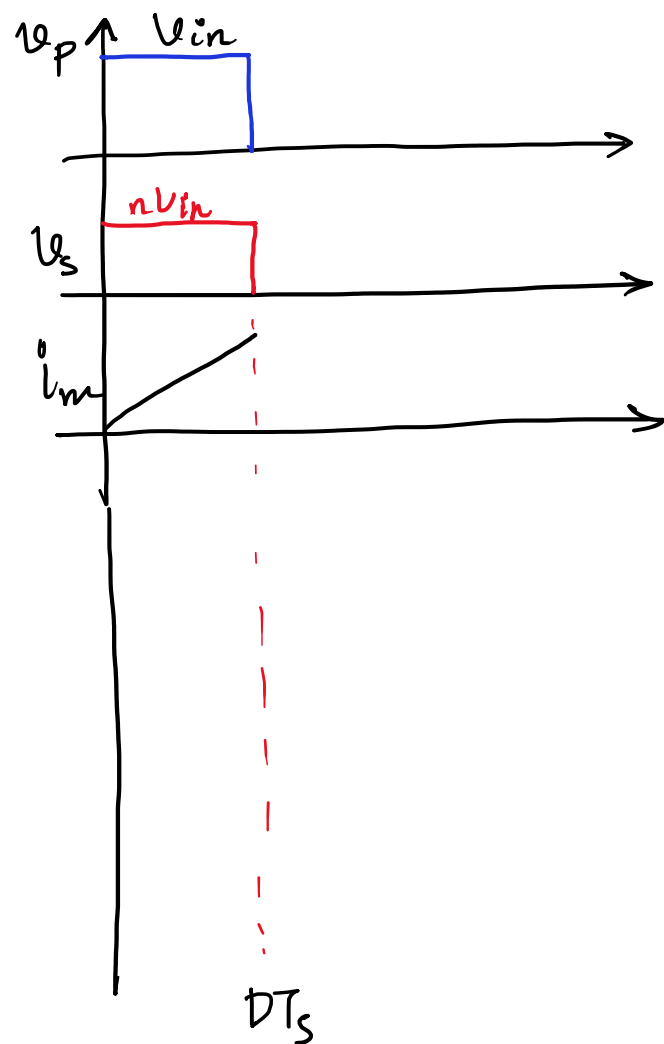


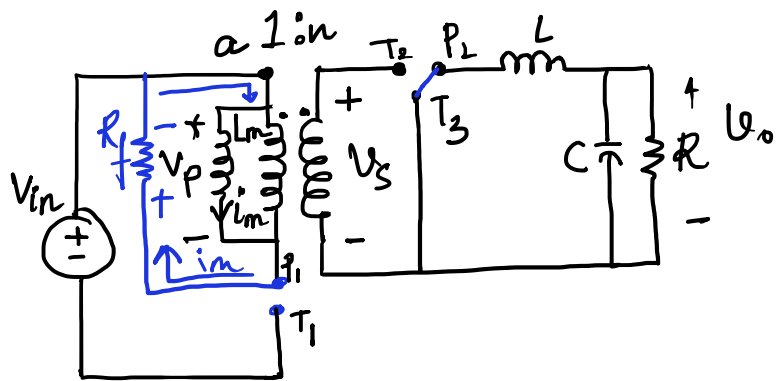


$$T_{P_1 T_1} > 0 \quad T_{T_2 P_2} > 0 \quad V_{P_2 T_3} > 0$$

$$V_{a P_1} > 0$$

[Energy loss element]
for flux to reduce





$$T_{P_1 T_1} > 0 \quad T_{T_2 P_2} > 0 \quad V_{P_2 T_3} > 0$$

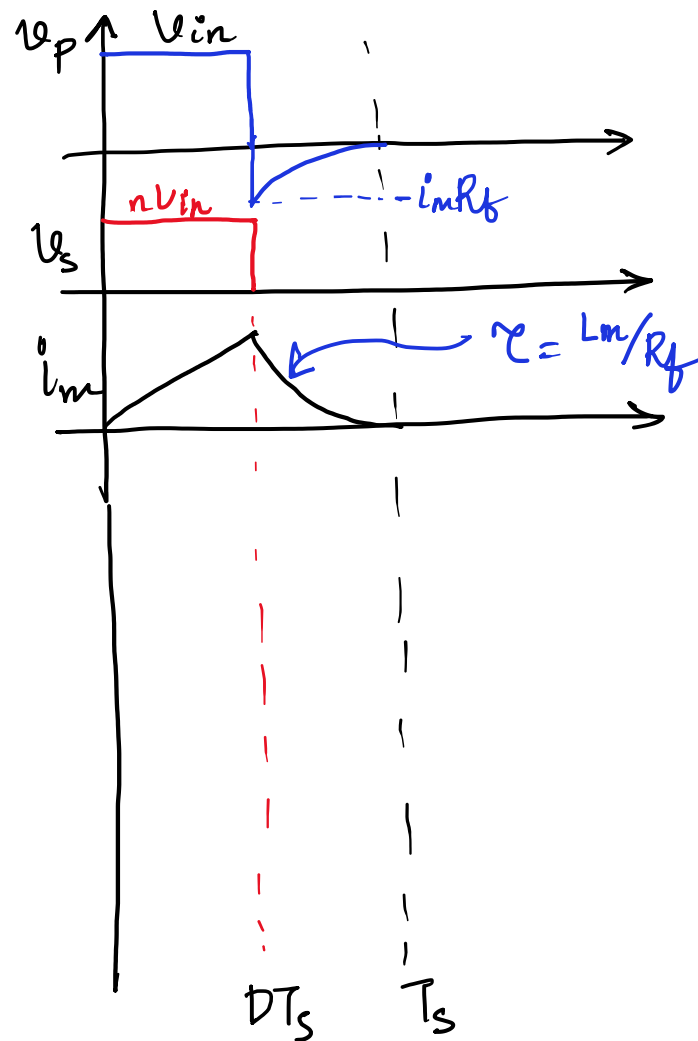
$$V_{a P_1} > 0$$

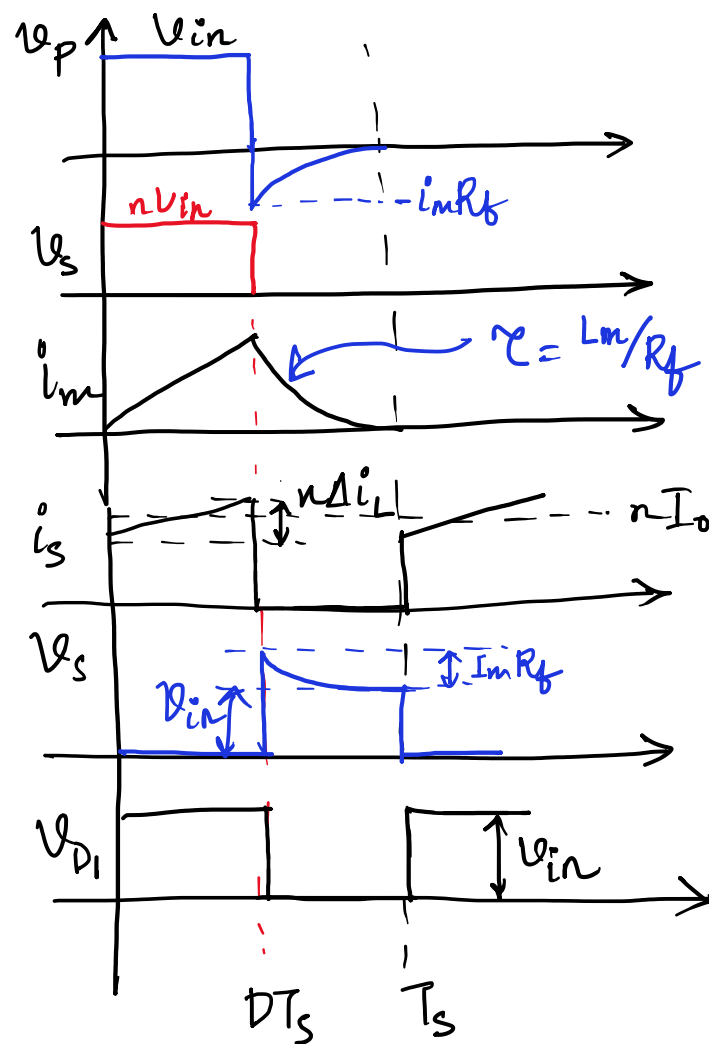
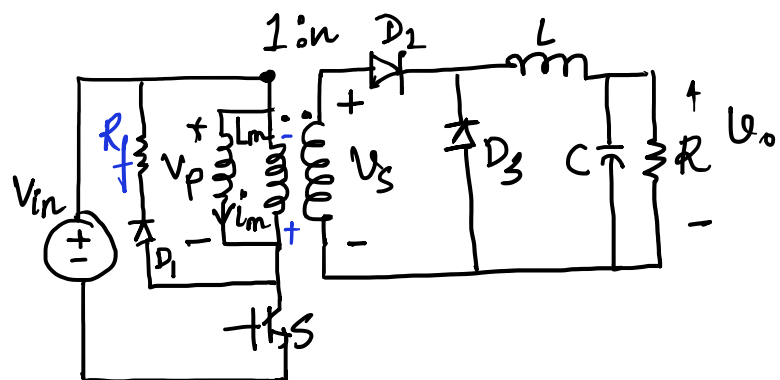
[Energy loss element]
for flux to reduce

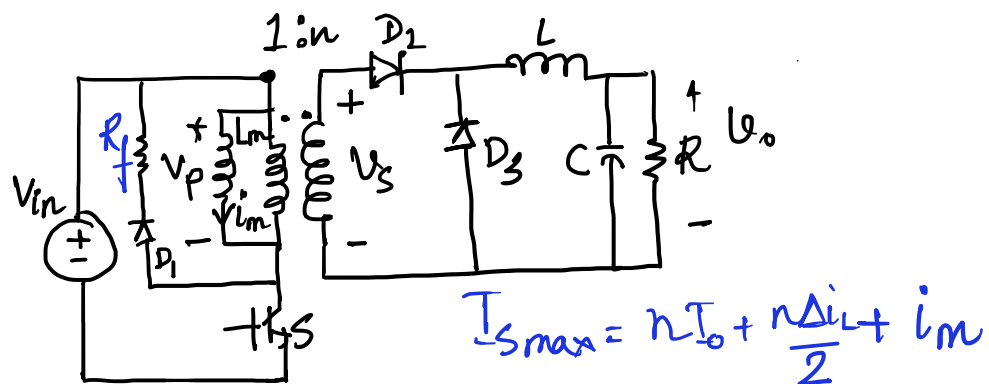
$$V_{P_1 T_1} = V_{in} + i_m R_f > 0$$

$$V_{T_2 P_2} < 0$$

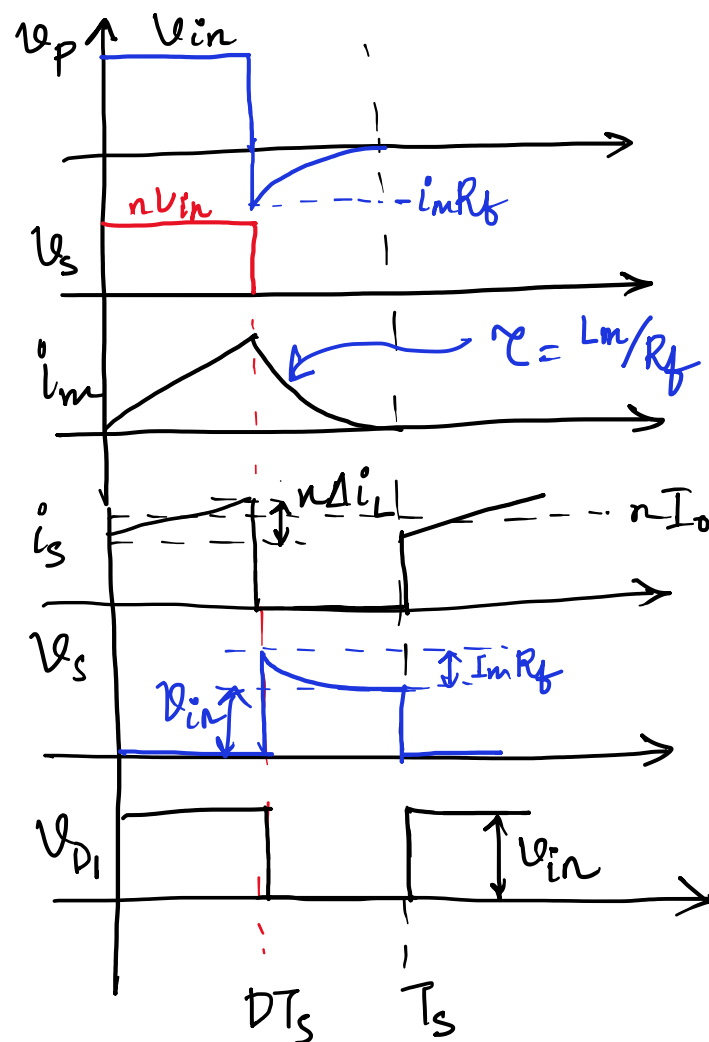
$$T_{T_3 P_2} > 0$$

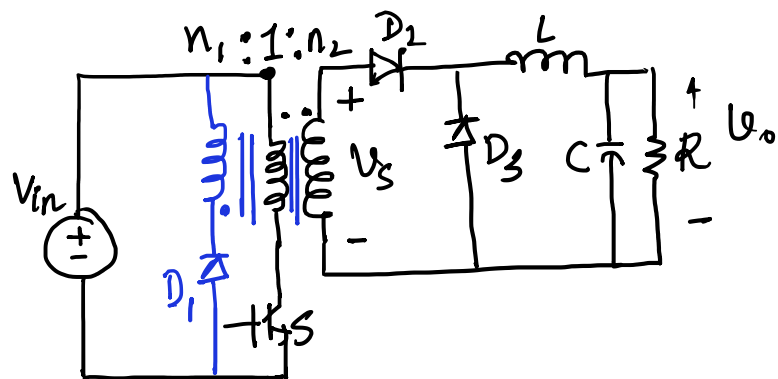






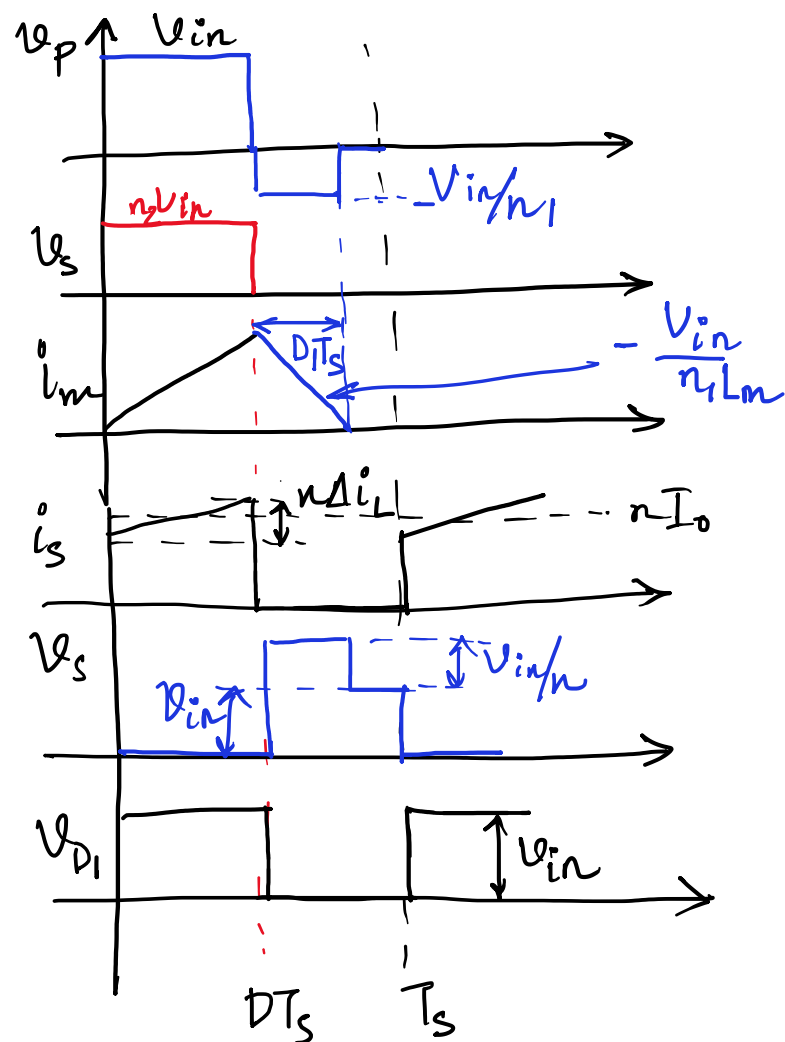
- Power loss in R_f
- Finite value of core flux at the end of cycle leads to saturation

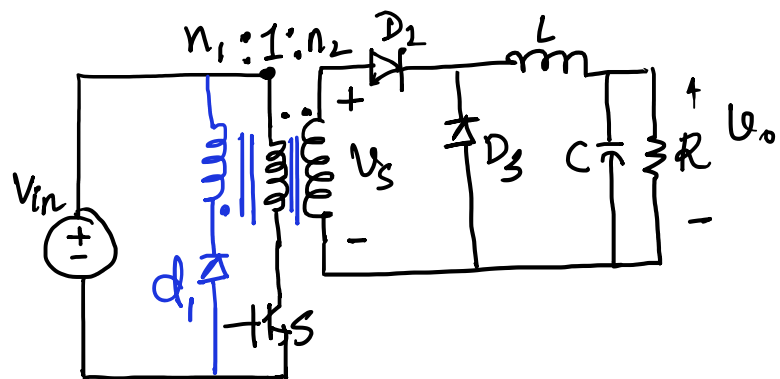




MMF at the end of DT_s
 $= \dot{i}_{mp}$

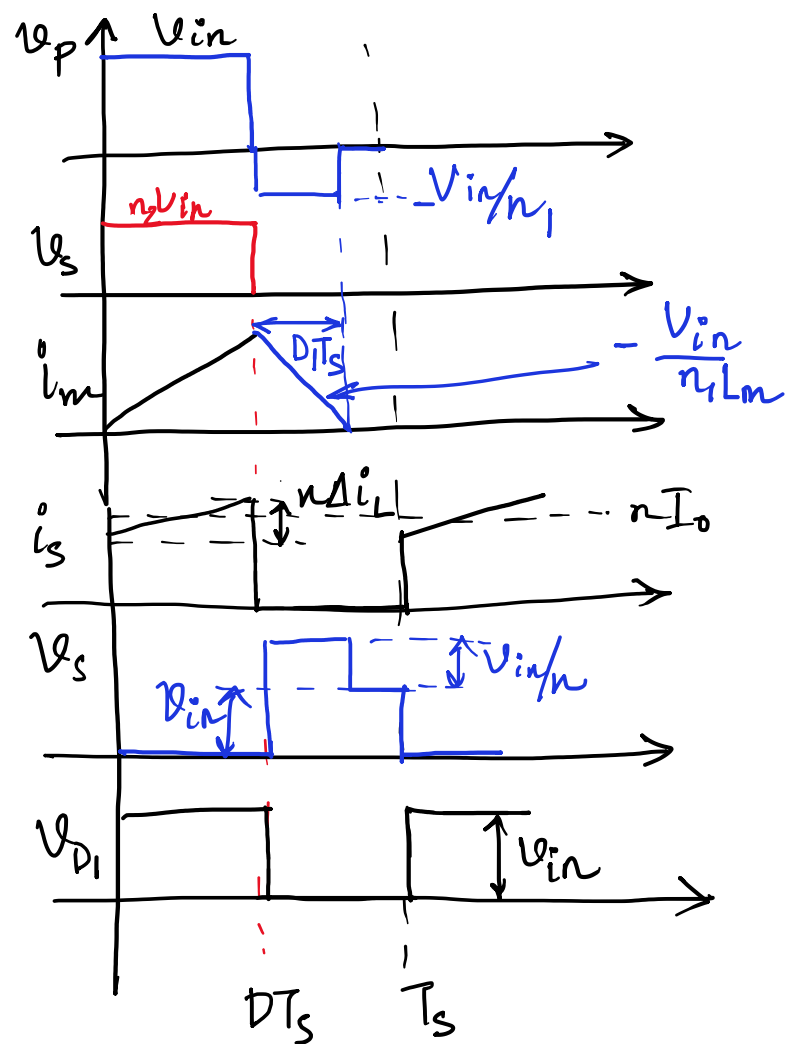
After DT_s duration the current is fed back to the input supply

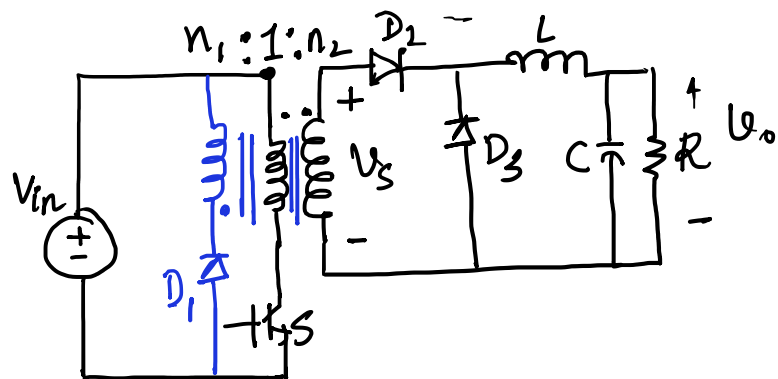




$$\overline{V_p} = V_{in} D - \frac{V_{in}}{n_1} D_1 = 0$$

$$\therefore D_1 = n D$$





Forward Converter

$$\bar{V}_p = V_{in}D - \frac{V_{in}}{n}D_1 = 0$$

$$\therefore D_1 = nD$$

$$1 - D - D_1 \geq 0$$

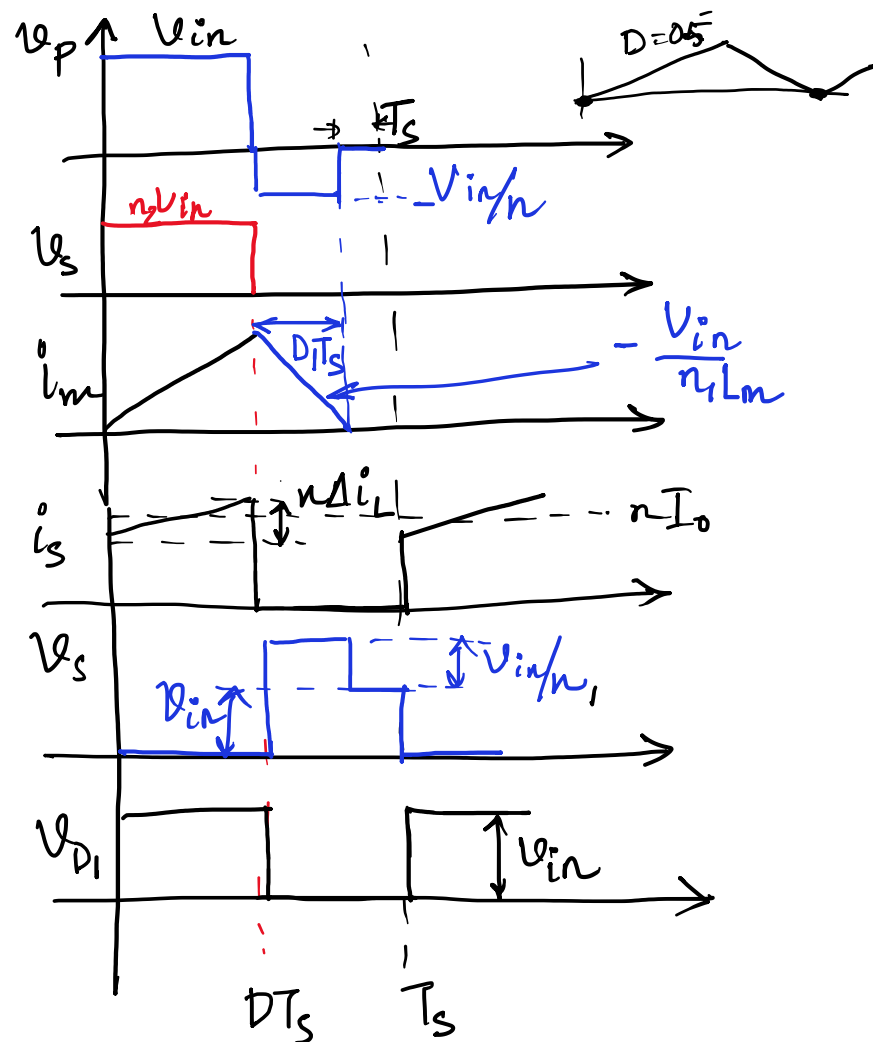
$$\Rightarrow 1 - D(1+n) \geq 0$$

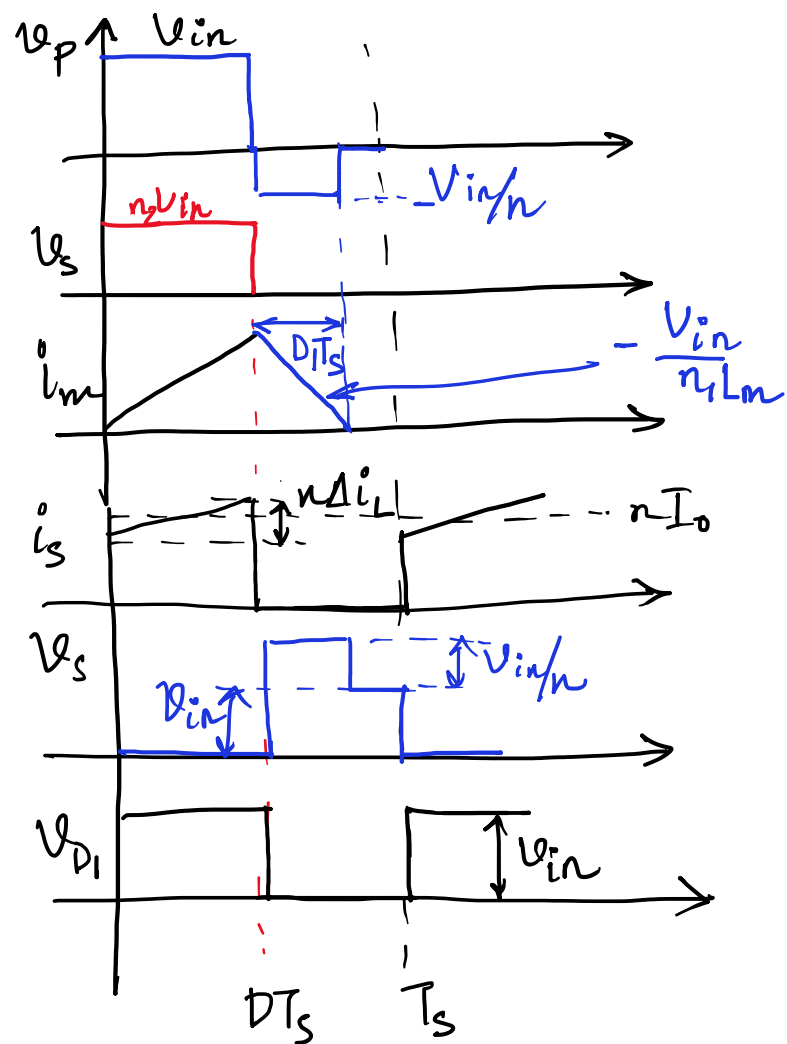
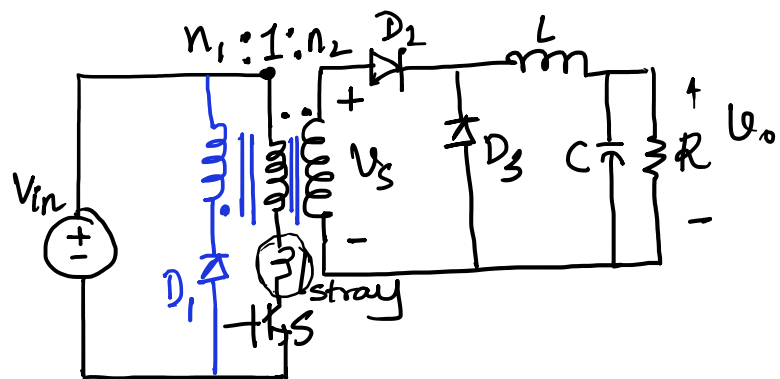
$$\Rightarrow D \leq \frac{1}{1+n_1}$$

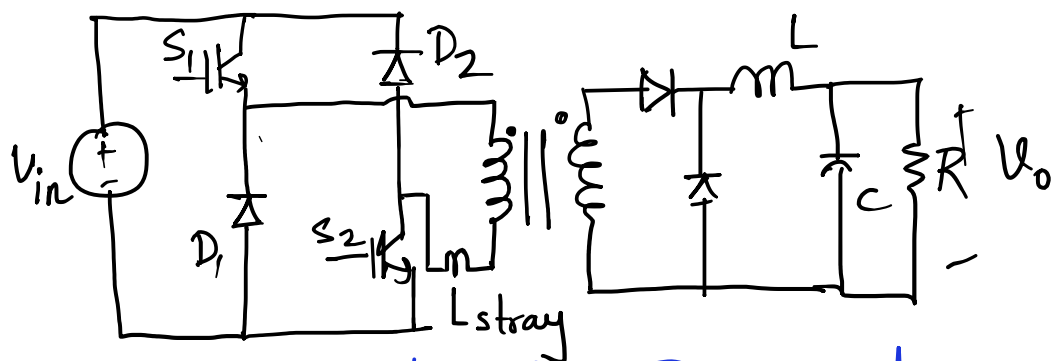
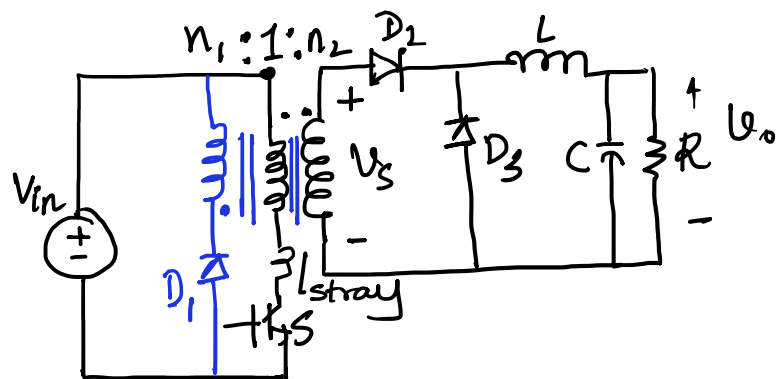
$$D \leq \frac{1}{2}$$

$n_1 > 1$
Time for flux reset
will be more

$n_1 < 1$
Voltage rating
of S ↑
 $\therefore n_1 = 1$

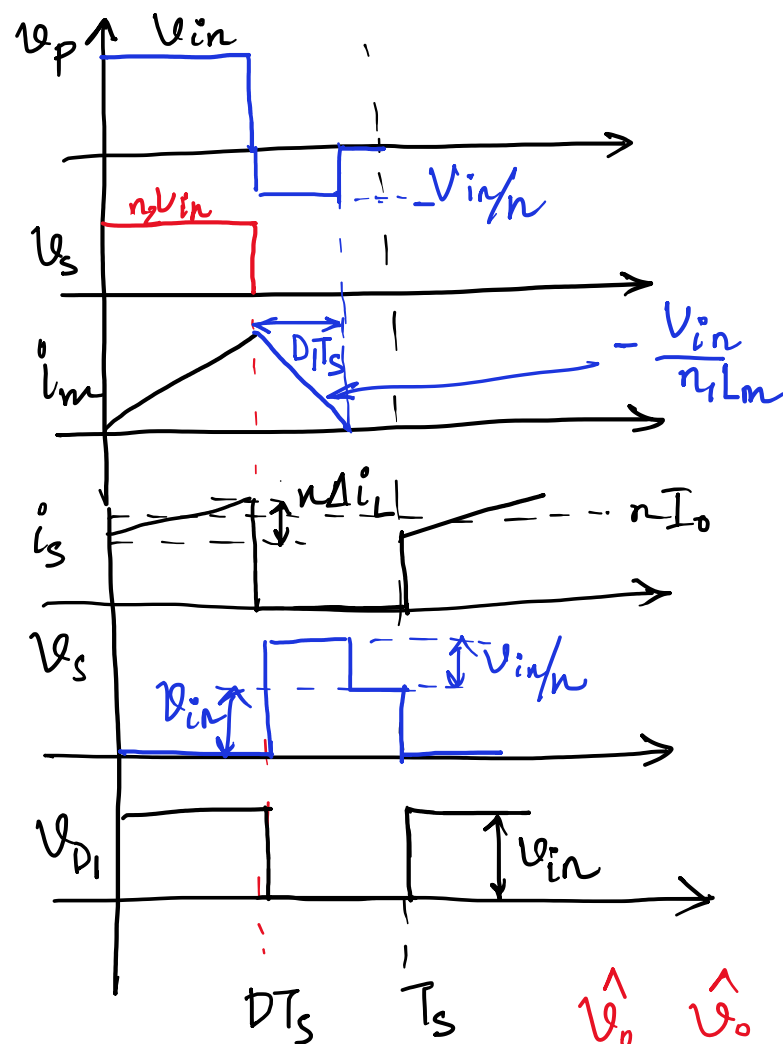






Dual switch forward converter

$$\frac{\hat{V}_o}{\hat{a}} / \frac{\hat{I}_L}{\hat{a}} =$$



$$\frac{\hat{V}_o}{\hat{a}} = \frac{\hat{V}_o}{\hat{I}_L} \sqrt{\frac{\hat{I}_L}{\hat{a}}}$$