

DC POWER SUPPLY

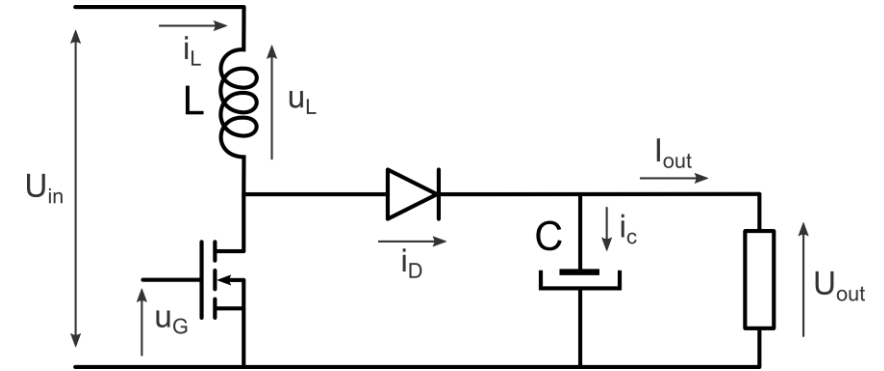
BOOST CONVERTER

DC POWER SUPPLY

Boost converter – basic concepts

- Assumptions and approximations
- Steady state

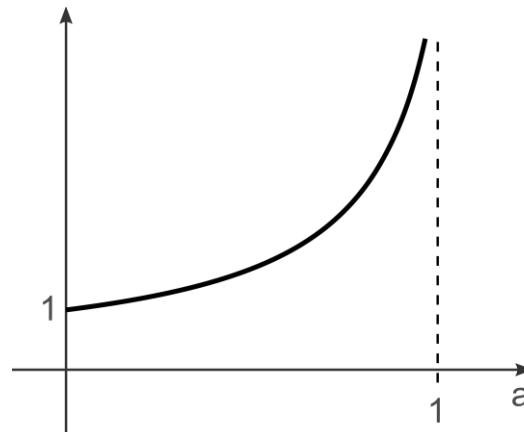
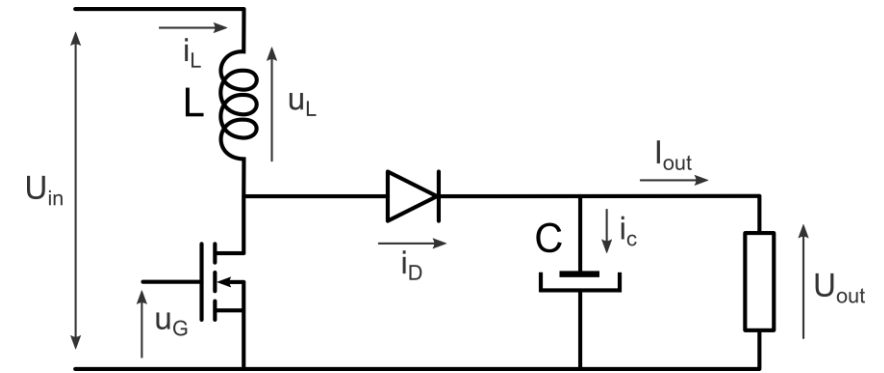
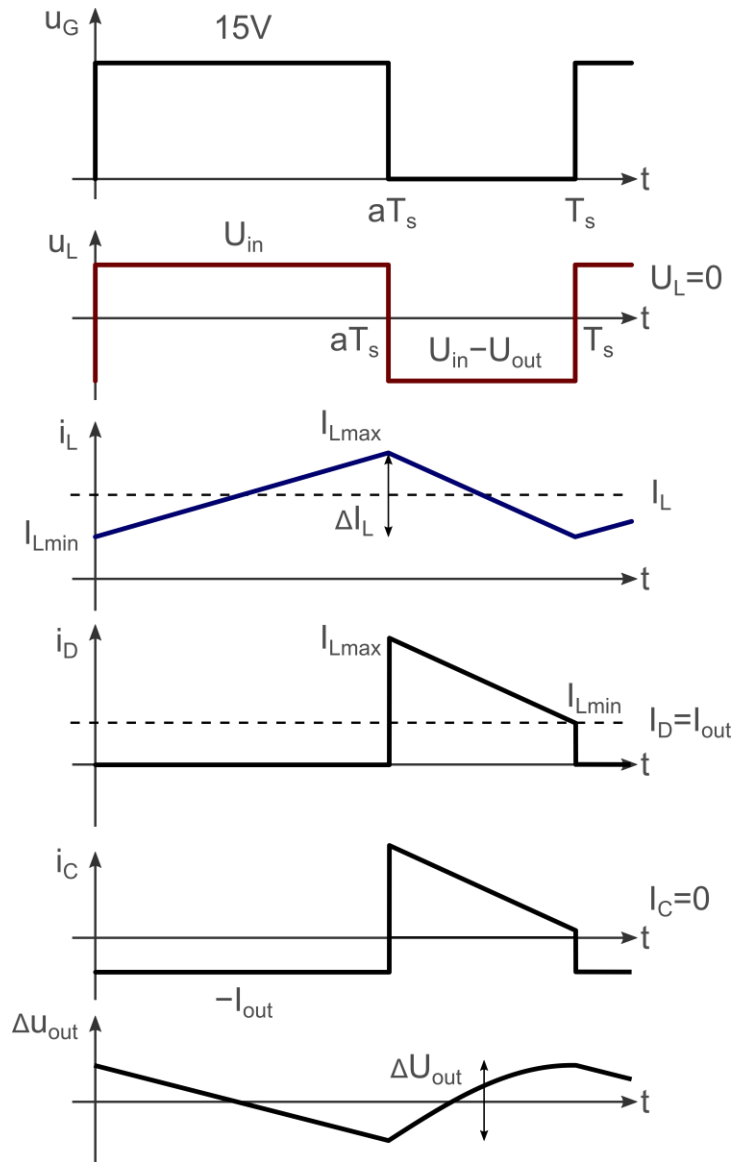
- The circuit:



DC POWER SUPPLY

Boost converter – basic concepts

- Voltage “turns-ratio”

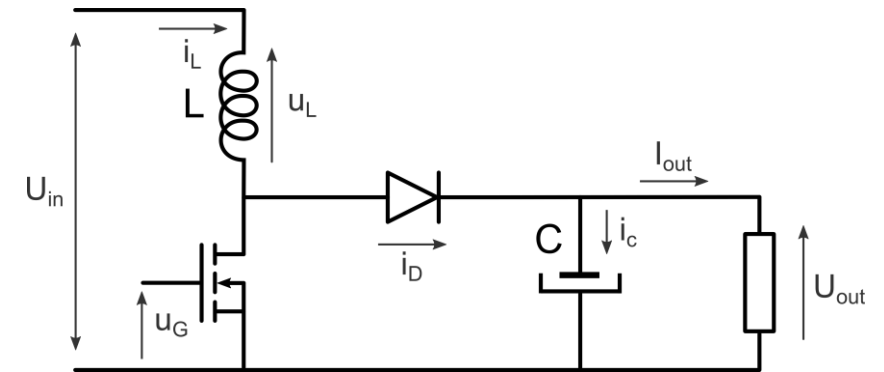
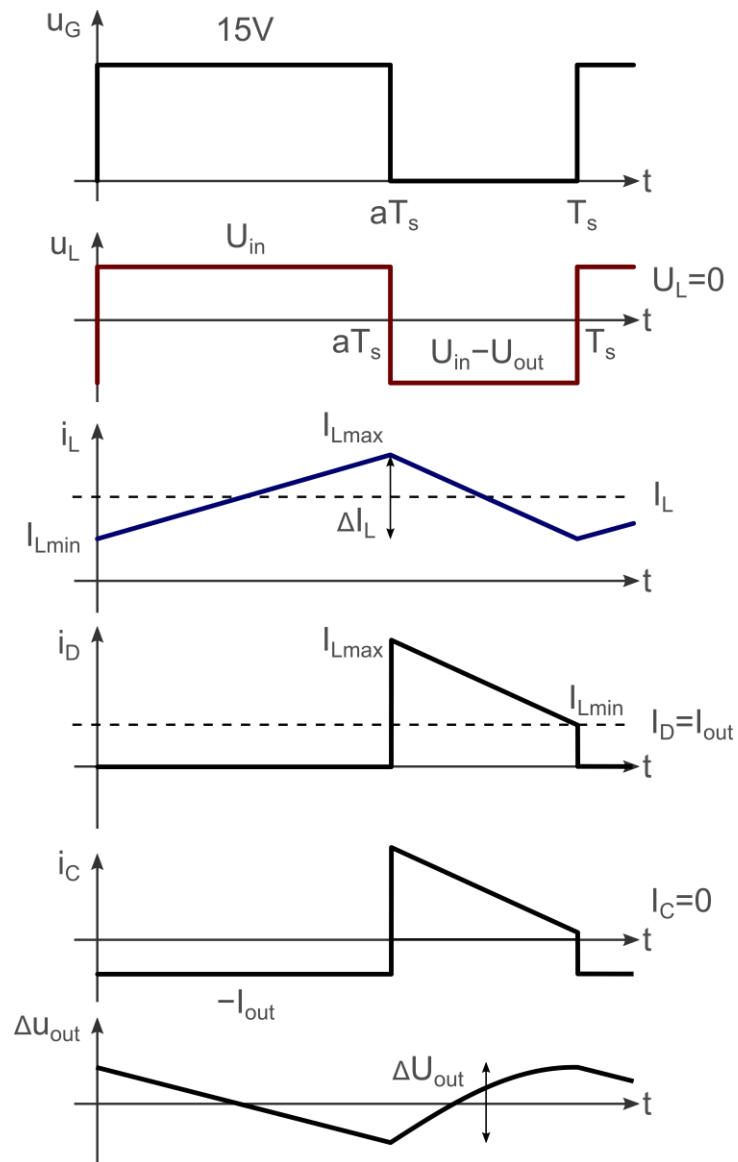


DC POWER SUPPLY

Boost - continuous conduction mode

Output filter (LC) design

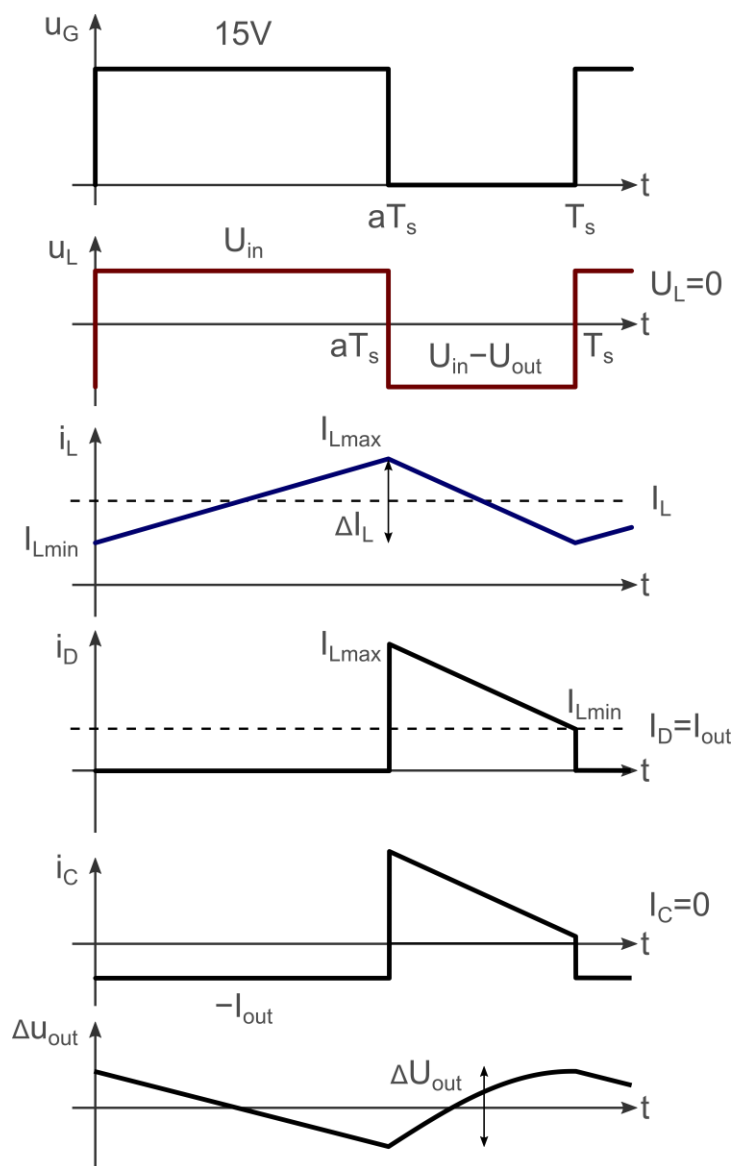
- $L=?$



DC POWER SUPPLY

Boost - continuous conduction mode

Output filter (LC) design



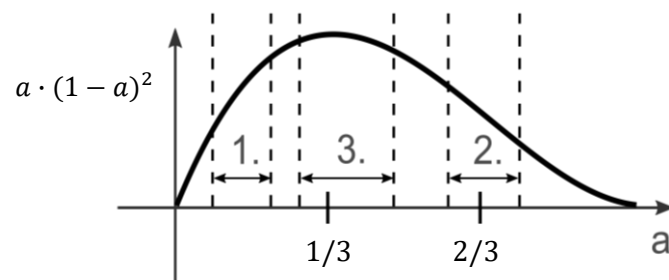
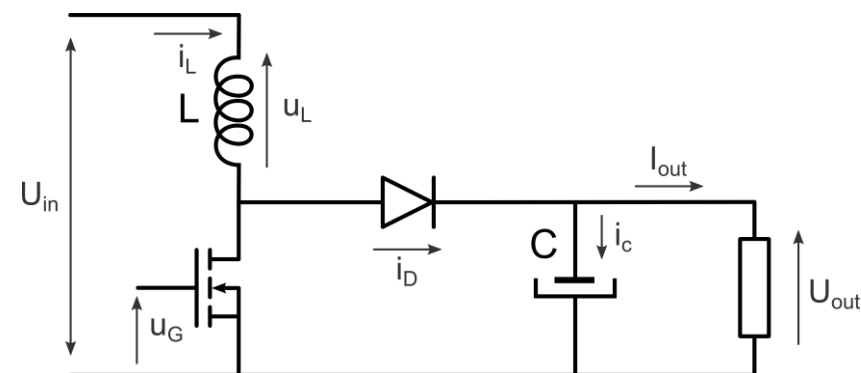
- $L = ?$

$$L \geq \frac{U_{out} \cdot a \cdot (1 - a)^2 \cdot T_S}{2 \cdot I_{out}}$$

$$I_{out} = I_{outmin}$$

$$I_{Lmax} = I_L + \frac{\Delta I_L}{2} =$$

$$\frac{I_{out}}{1 - a} + \frac{U_{out} \cdot a \cdot (1 - a) T_S}{2 \cdot L}$$



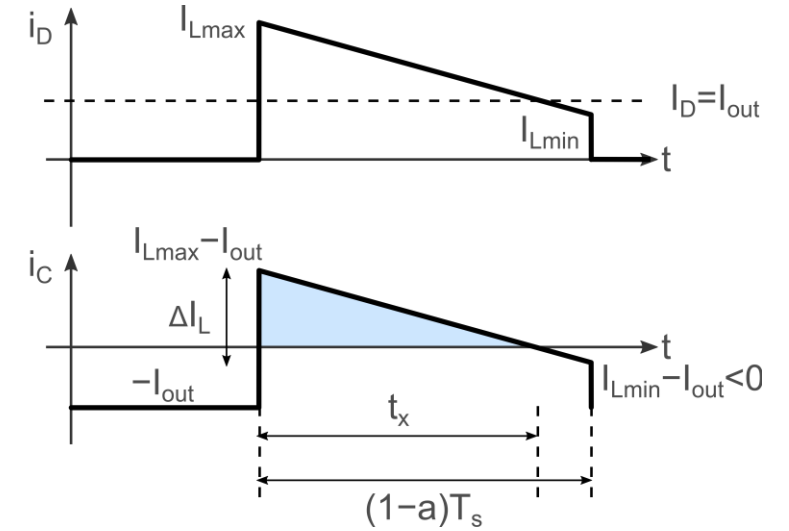
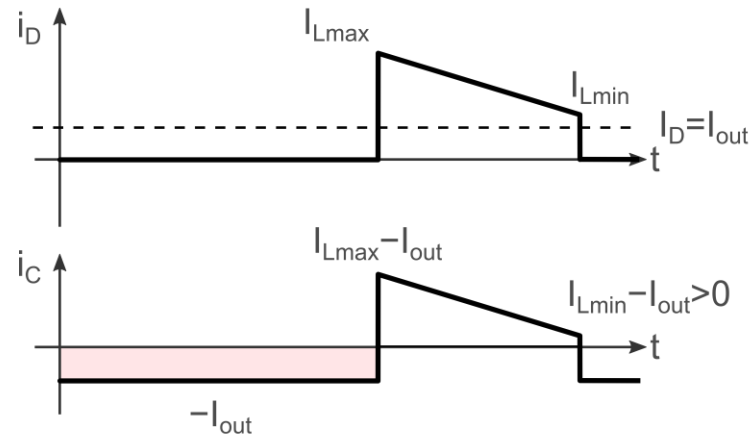
DC POWER SUPPLY

Boost - continuous conduction mode

Output filter (LC) design

- $C=?$

$$\Delta U_{out} = \frac{Q}{C} \leq \Delta U_{outmax}$$



DC POWER SUPPLY

Boost - discontinuous conduction mode

