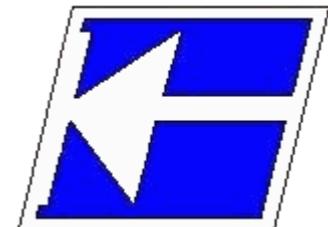


Instituto Federal de Educação, Ciência e Tecnologia de Santa Catarina
Departamento Acadêmico de Eletrônica
Eletrônica de Potência



Conversores CC-CC Não-Isolados (Conversor Boost)

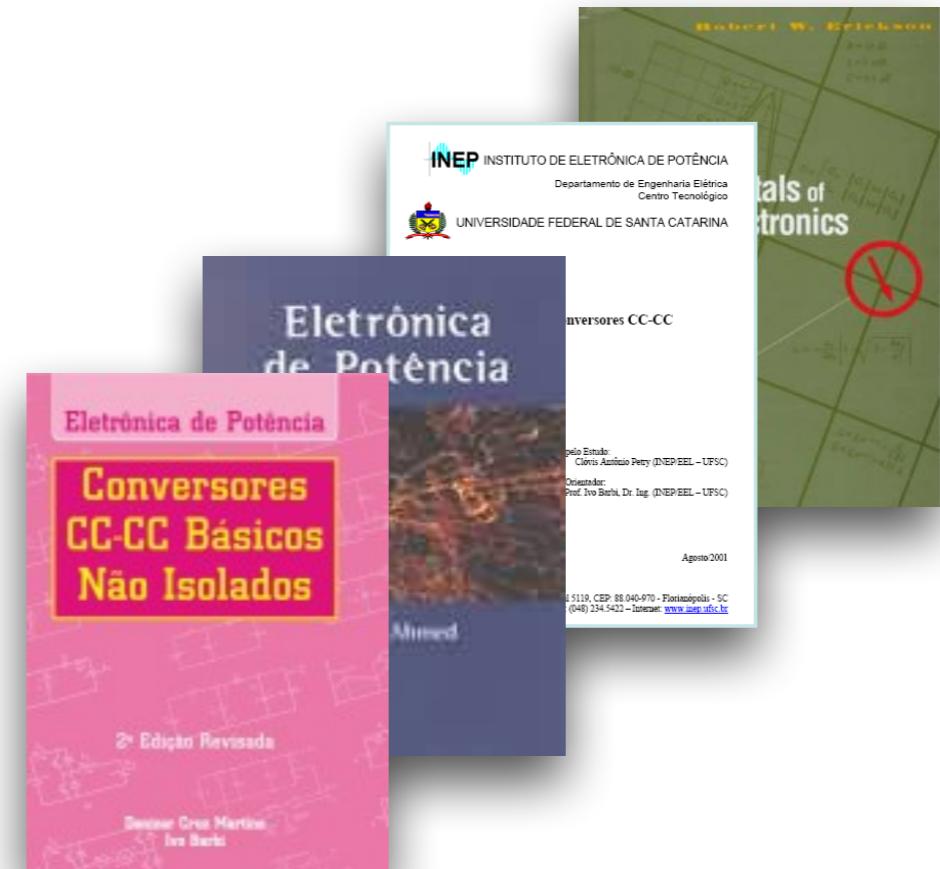
Prof. Clovis Antonio Petry.

Florianópolis, novembro de 2015.

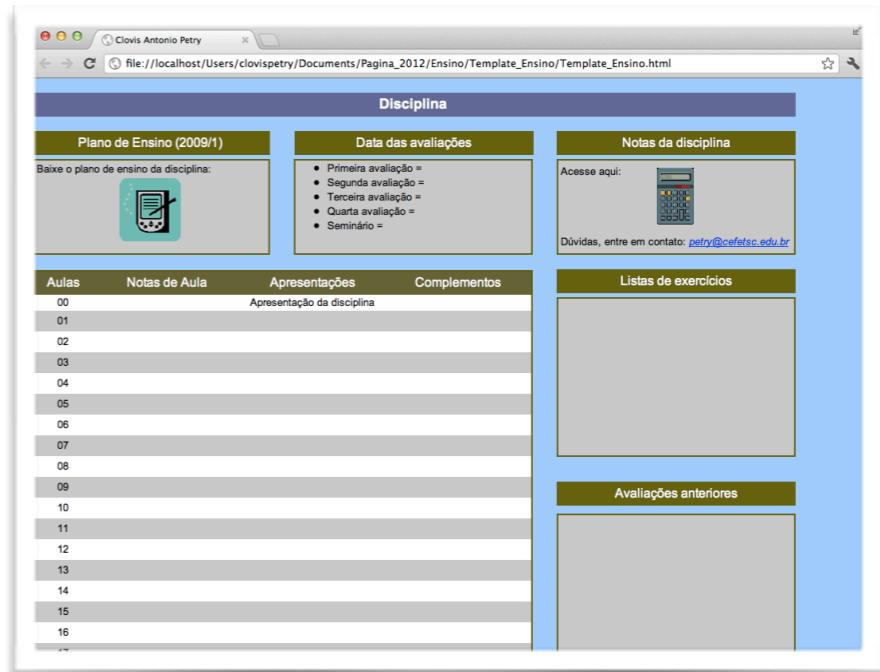
Biografia para Esta Aula

Capítulo 9 - Conversores cc-cc:

- Introdução aos conversores cc-cc.



www.ProfessorPetry.com.br



The screenshot shows a web-based teaching template. At the top, it says "Disciplina". Below that, there's a section for the "Plano de Ensino (2009/1)" which includes a link to download the plan and a calculator icon. To the right, there's a section for "Data das avaliações" with a list of evaluation types: Primeira avaliação, Segunda avaliação, Tercera avaliação, Quarta avaliação, and Seminário. Further down, there's a grid for "Aulas" (classes) numbered 00 to 16, with "Notas de Aula" (class notes) and "Apresentações" (presentations) listed under each. There's also a "Complementos" (complements) section. To the right, there's a "Notas da disciplina" (discipline notes) section with a calculator icon and a link to email ("acesse aqui: petry@cefeesc.edu.br"). Below that is a "Listas de exercícios" (exercise lists) section and a "Avaliações anteriores" (previous evaluations) section.

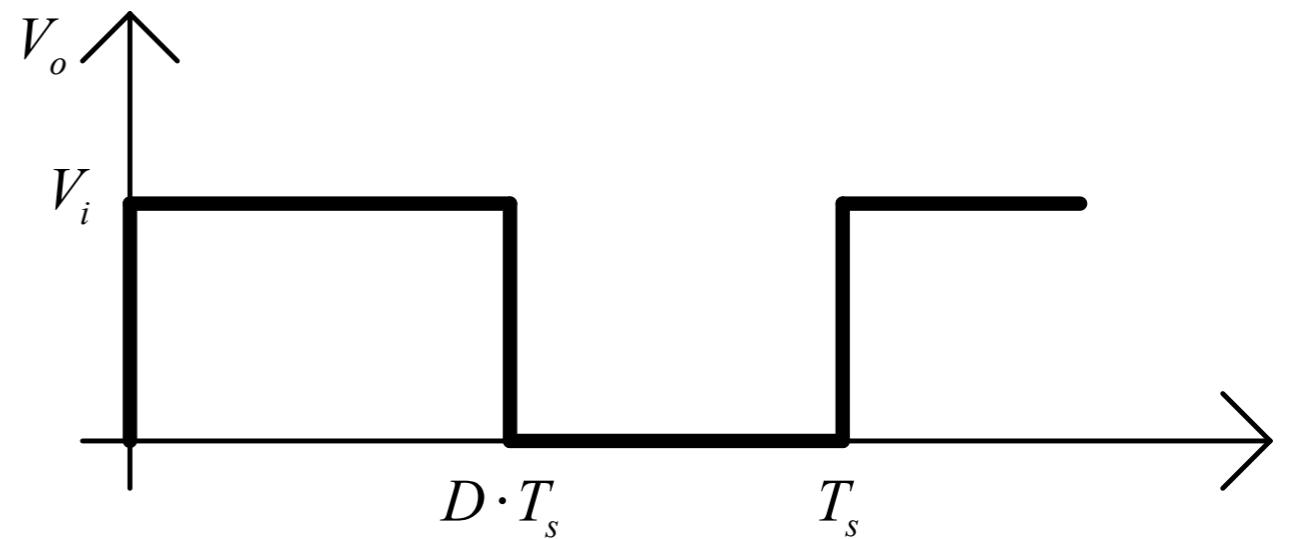
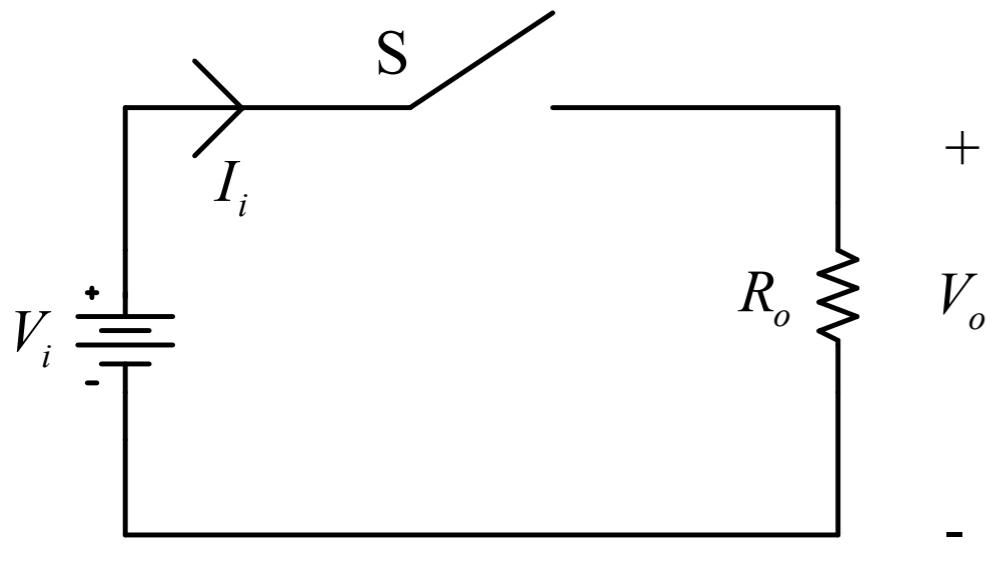
Nesta Aula

Conversores cc-cc:

- Introdução;
- Princípio geral;
- Conversor Buck;
- Conversor Boost.



Princípio Geral



Tensão média na saída:

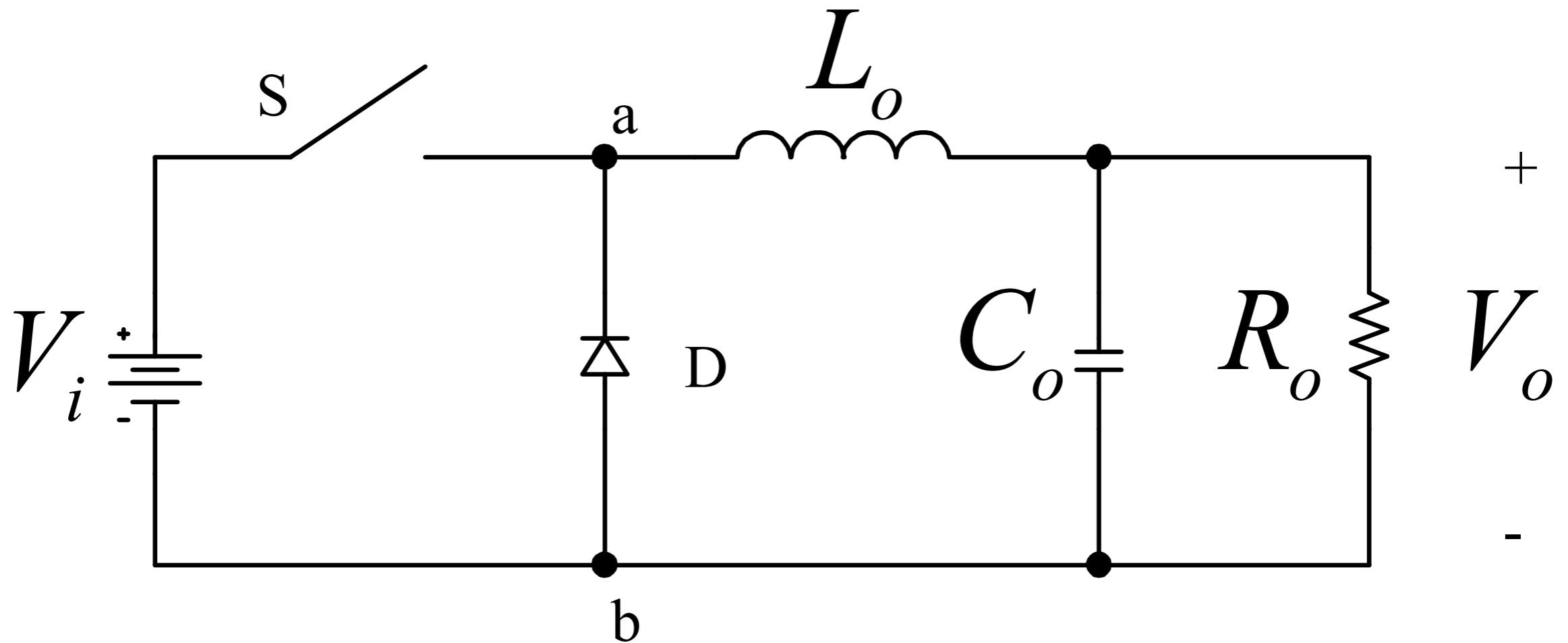
$$V_{med} = V_o = \frac{1}{T_s} [V_i \cdot D \cdot T_s]$$

$$V_o = D \cdot V_i$$

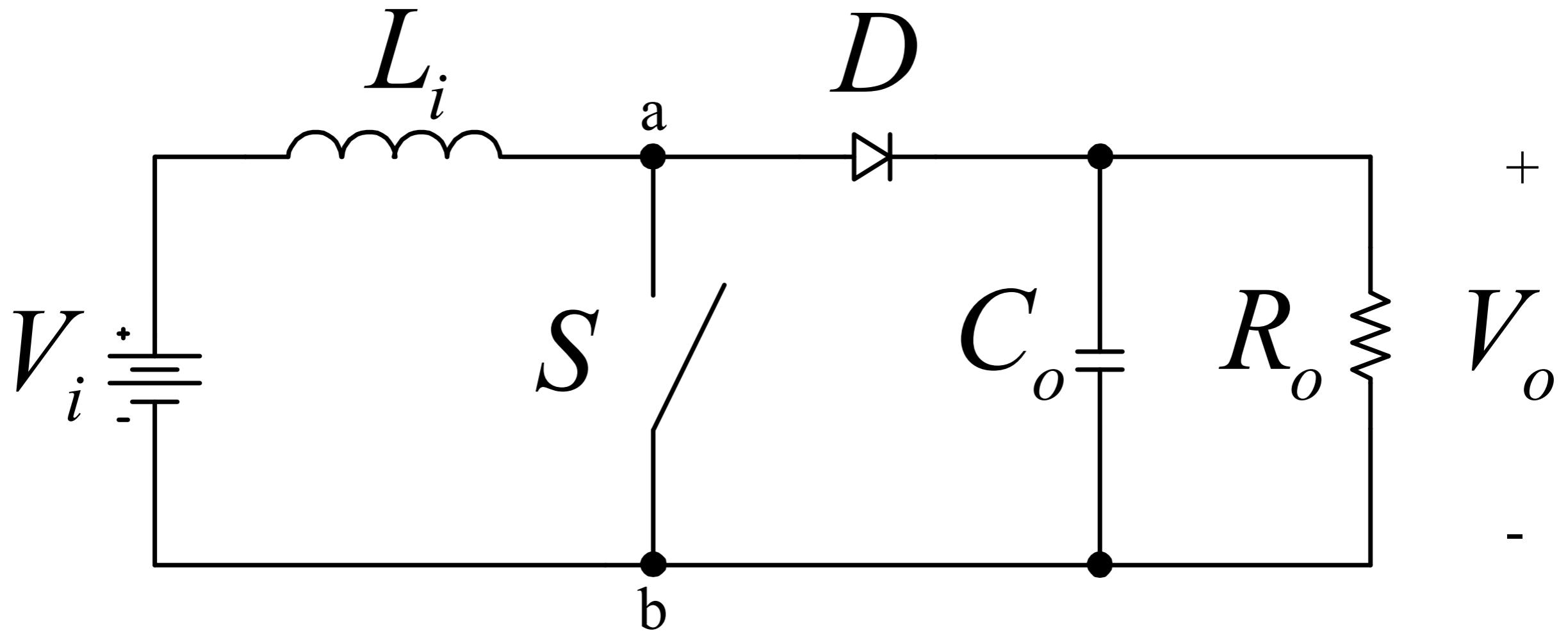
$$T_{on} = D \cdot T_s$$

$$D = \frac{V_o}{V_i}$$

Conversor Buck



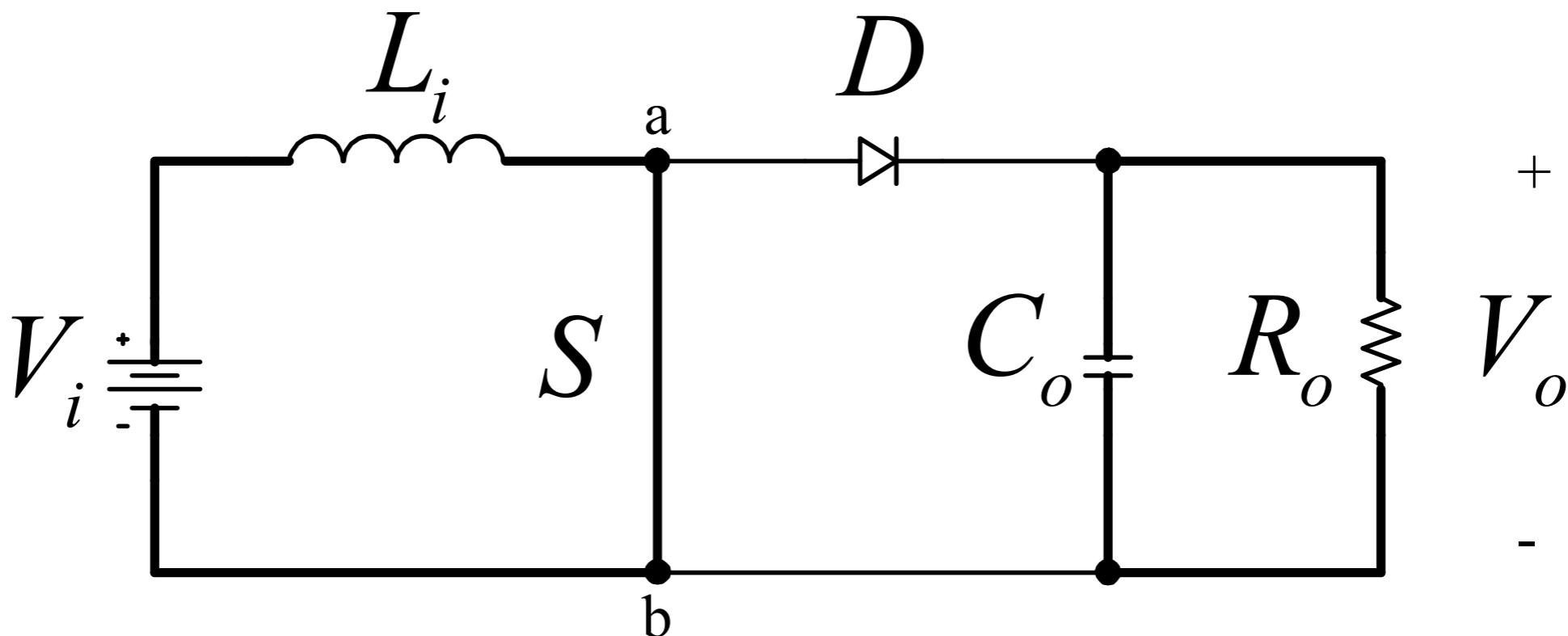
Conversor Boost



Conversor Boost

Primeira etapa de funcionamento:

1. Interruptor conduzindo;
 - Díodo bloqueado;
 - Energia sendo armazenada no indutor.

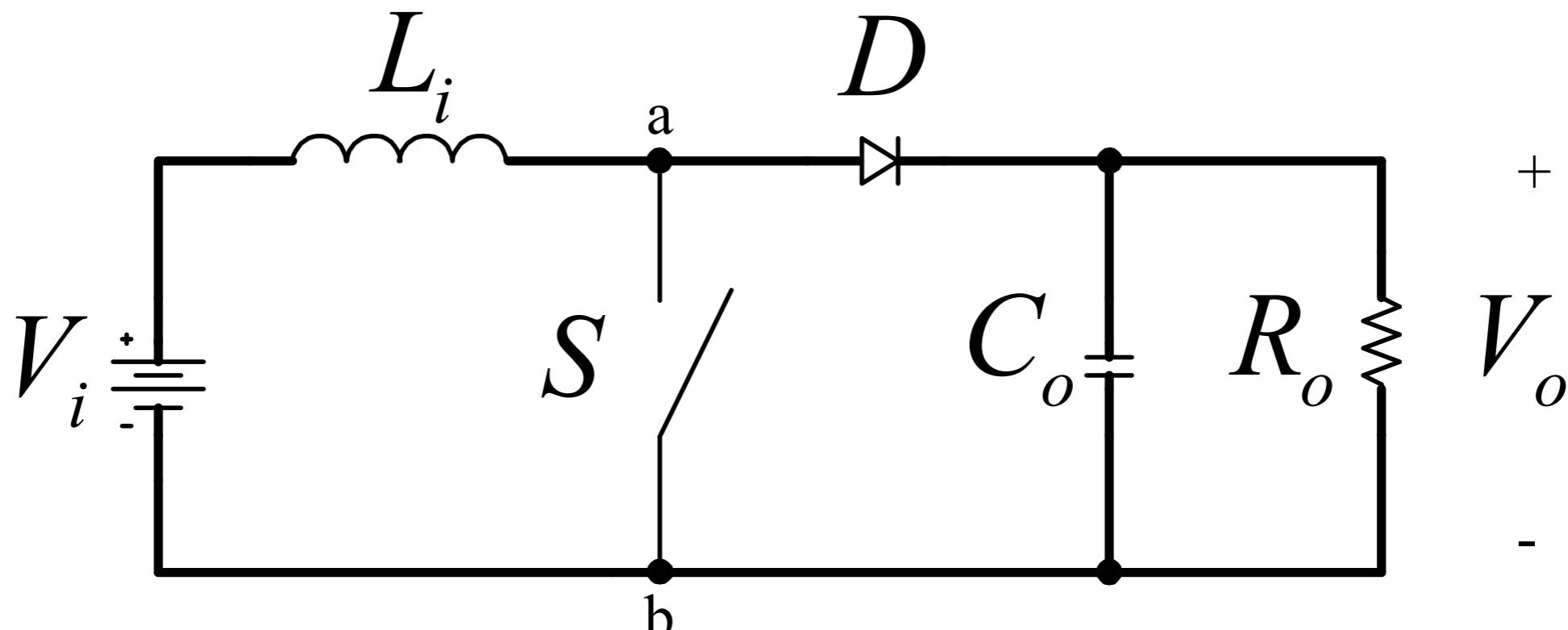


$$0 \leq t < D \cdot T_s$$

Conversor Boost

Segunda etapa de funcionamento:

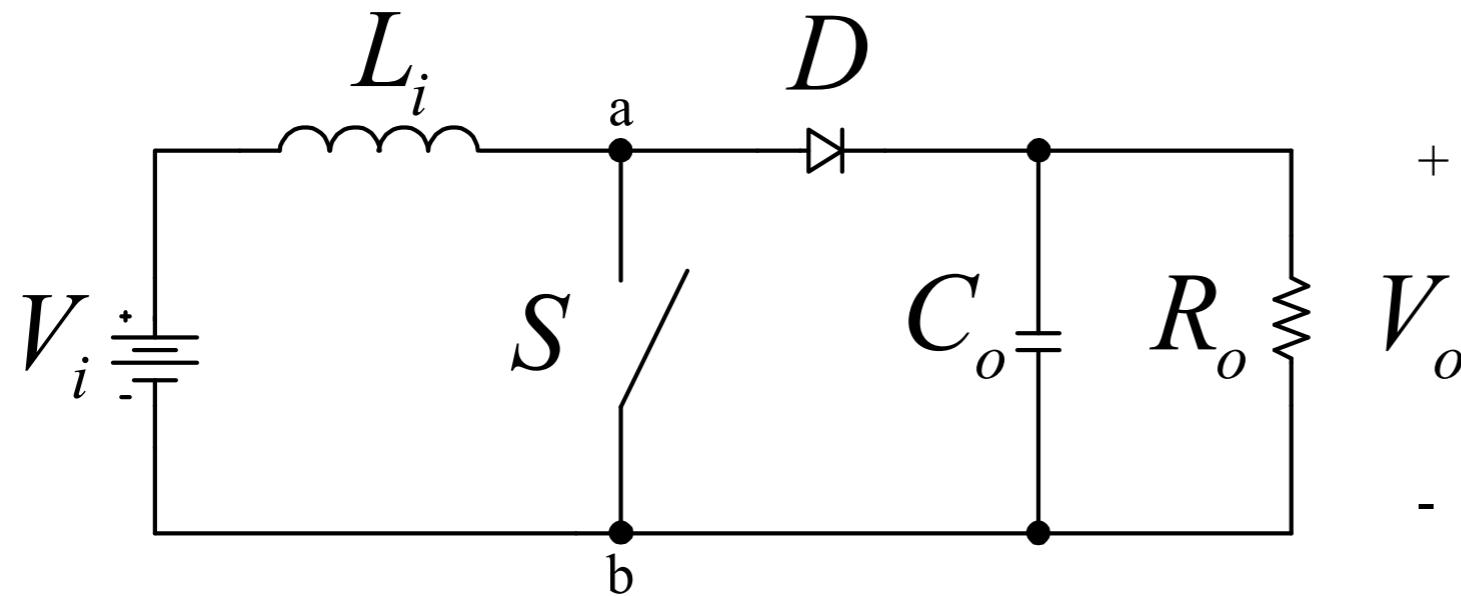
- Interruptor bloqueado;
- Díodo conduzindo;
- Energia armazenada no indutor sendo transferida para saída.



$$D \cdot T_s \leq t < T_s$$

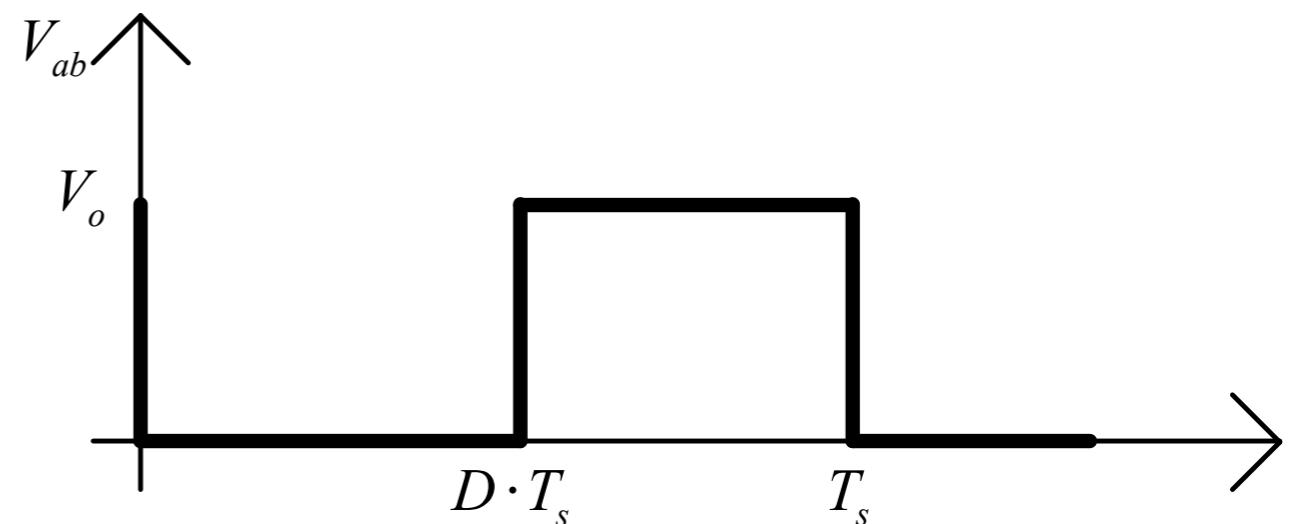


Conversor Boost



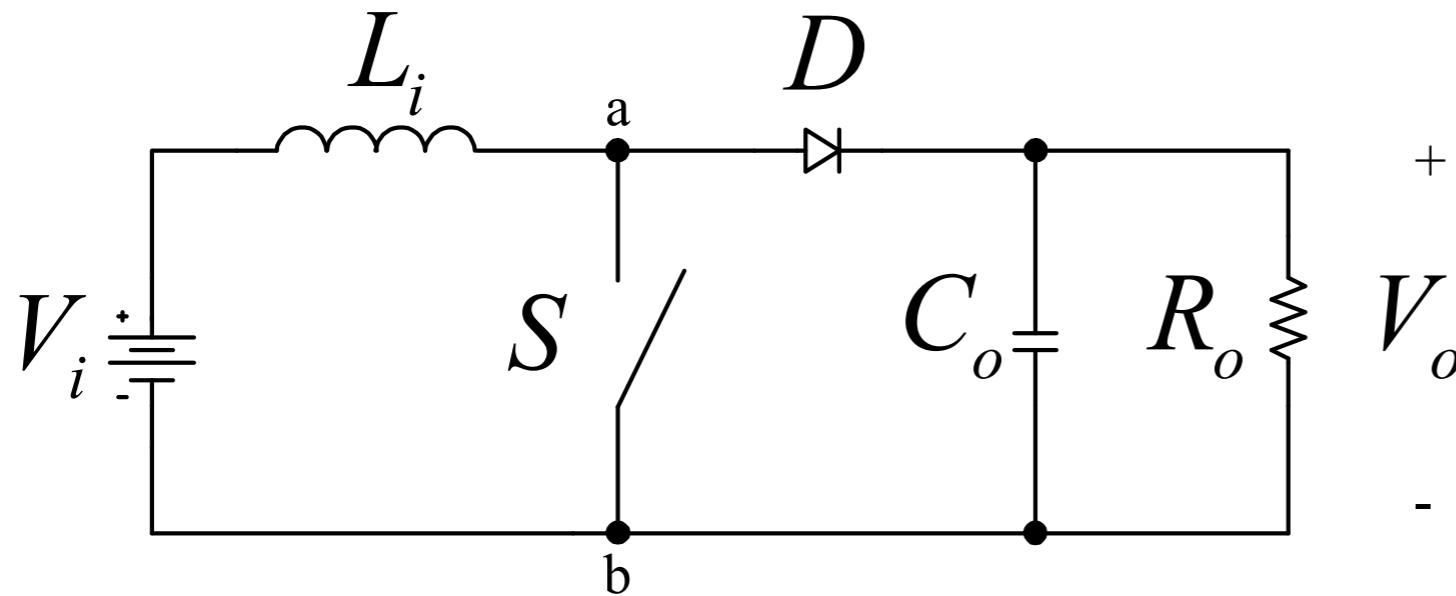
$$V_{ab} = \frac{1}{T_s} \left(V_o \cdot (T_s - D \cdot T) \right)$$

$$V_{ab} = V_o \cdot (1 - D)$$





Conversor Boost

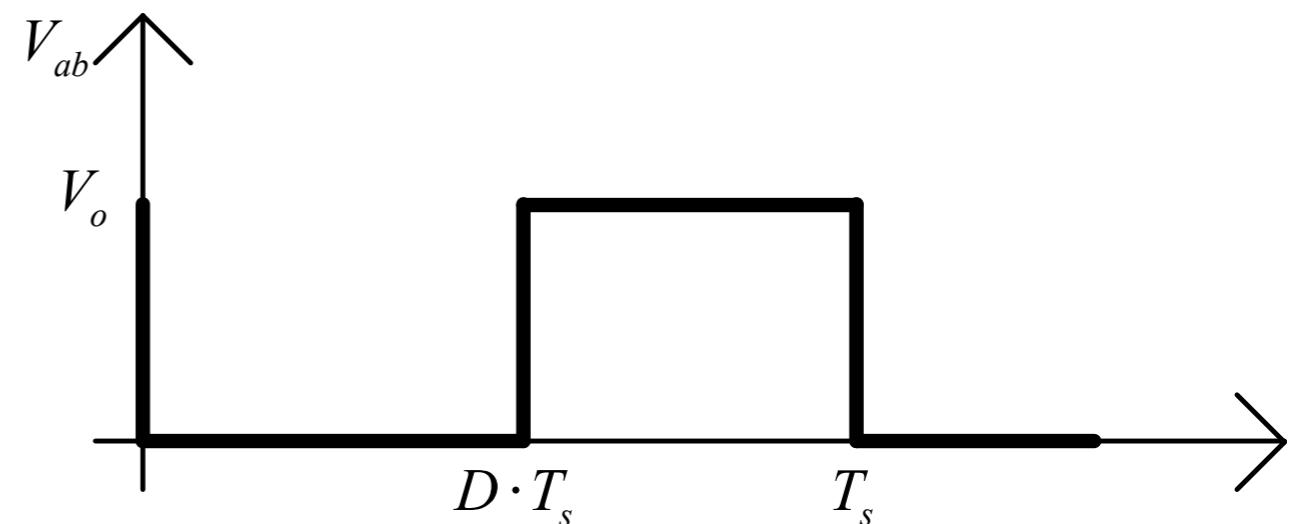


$$V_{ab} = \frac{1}{T_s} \left(V_o \cdot (T_s - D \cdot T) \right)$$

$$V_{ab} = V_o \cdot (1 - D)$$

$$V_{ab} = V_i$$

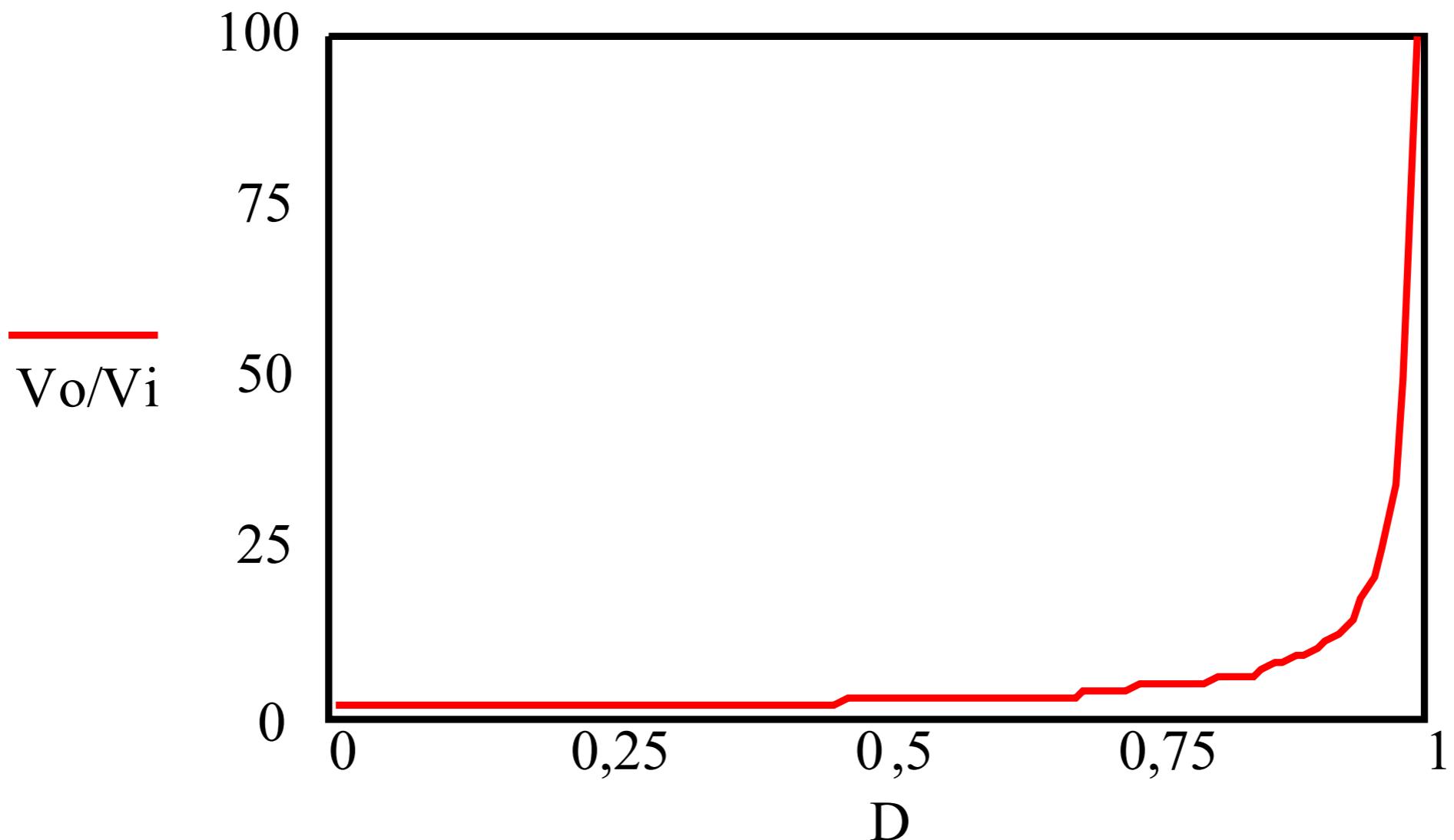
$$V_o = \frac{V_i}{1 - D}$$



$$D = 1 - \frac{V_i}{V_o}$$

Conversor Boost

Ganho estático em função da razão cíclica:



Conversor Boost

Elementos passivos:

$$\Delta I_{Li} = \frac{V_i}{L_i \cdot F_s} \cdot D$$

$$I_{Li} = \frac{V_i}{R_o} \cdot \frac{1}{(1 - D)^2}$$

$$\Delta V_{Co} = \frac{I_o}{C_o \cdot F_s} \cdot \frac{V_o - V_i}{V_o}$$

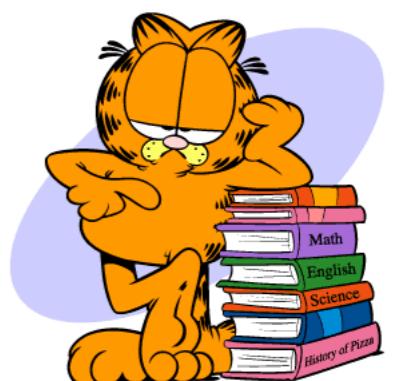
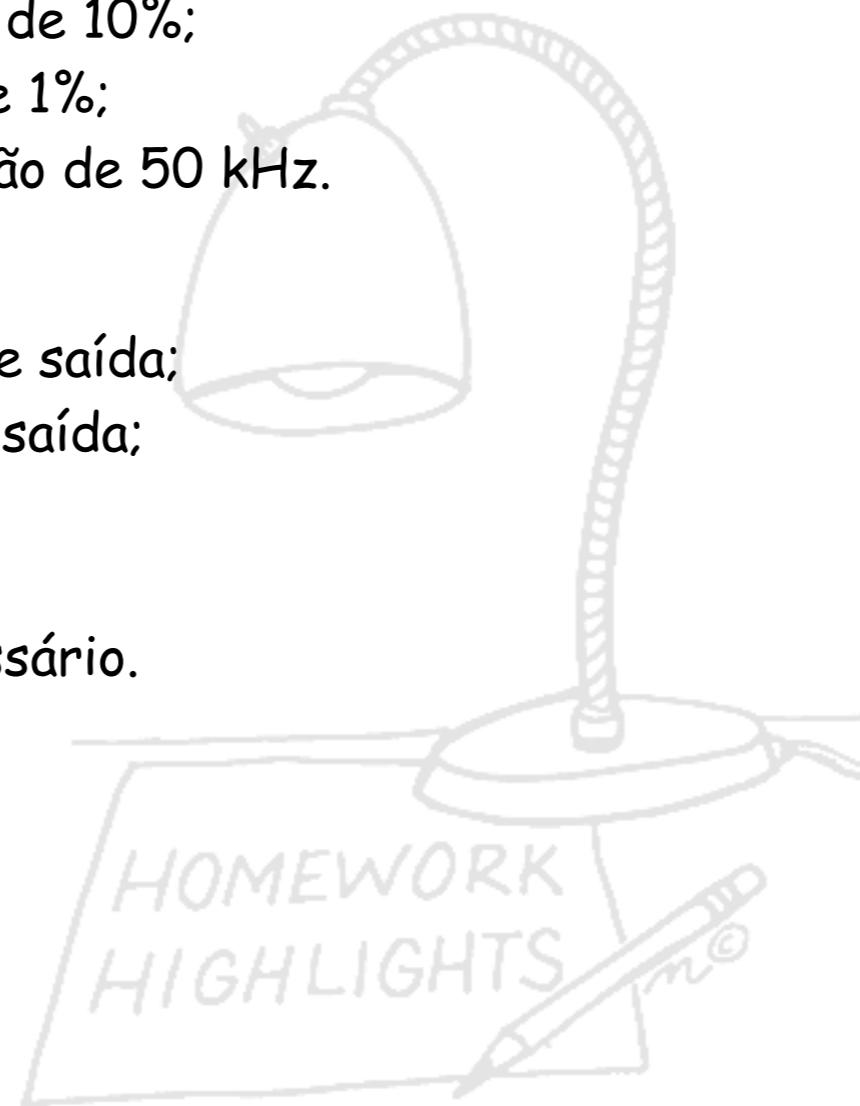
Tarefas

Exercício 4) Faça o projeto de um conversor Boost considerando:

- Tensão de entrada de 5 V;
- Tensão de saída de 12 V;
- Carga resistiva de 50 W;
- Ondulação de corrente de 10%;
- Ondulação de tensão de 1%;
- Freqüência de comutação de 50 kHz.

Determine:

- Indutância do filtro de saída;
- Capacitor do filtro de saída;
- Interruptor;
- Diodo;
- Dissipadores, se necessário.





Próxima Aula

Conversores cc-cc:

- Conversor Buck-Boost.

