METU EE462 Utilization of Electric Energy

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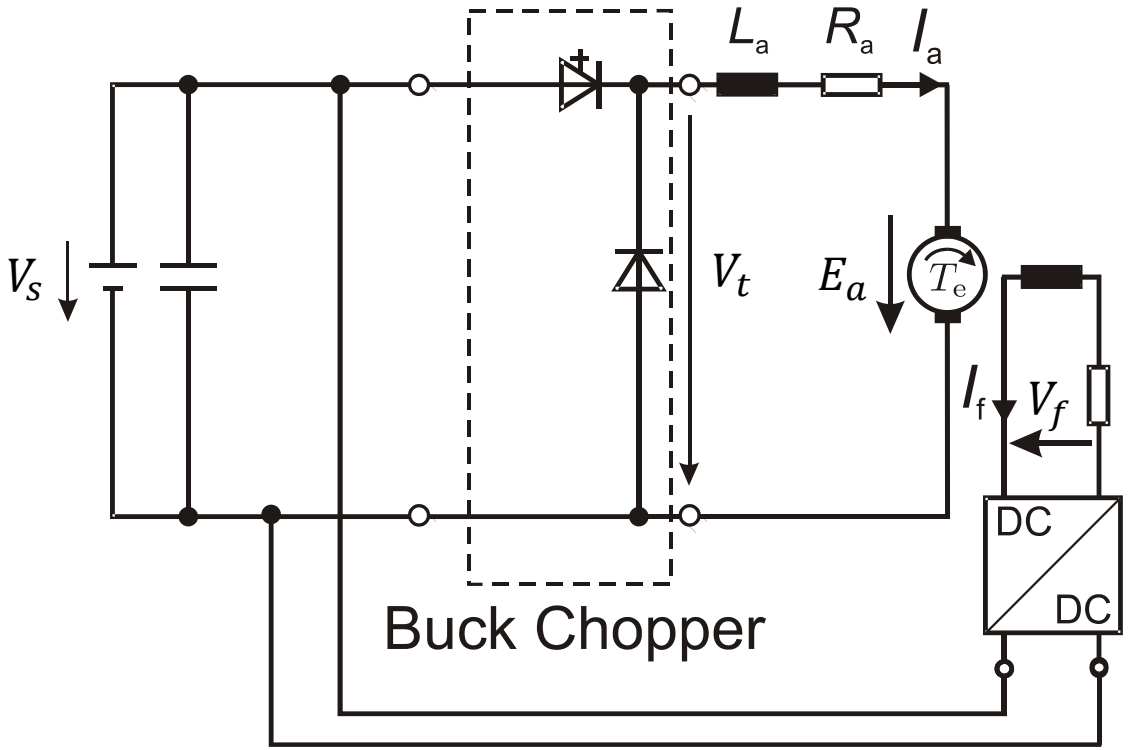
Office: C-107

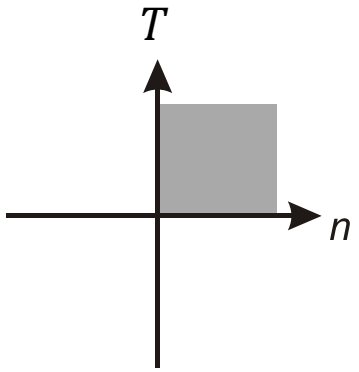
Content

DC machine drive configurations

- DC/DC Drives – DC/DC Choppers
- AC/DC Drives
- 3Ph AC/DC Drives

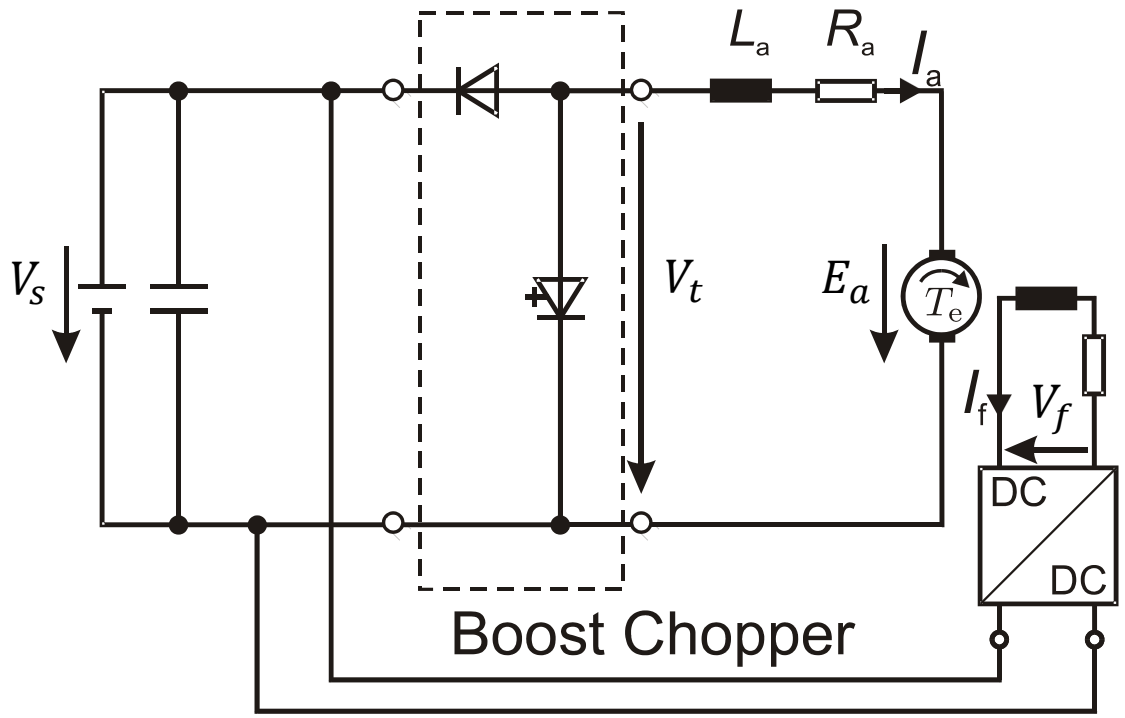
DC/DC Choppers - Buck Chopper

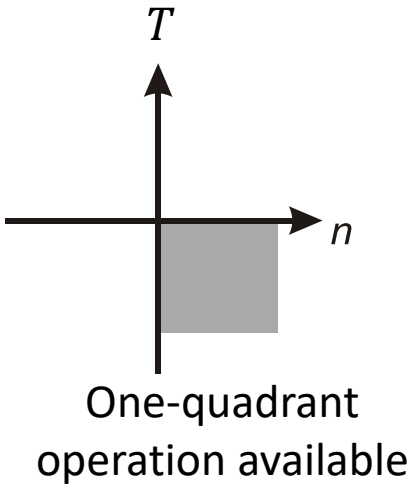




One-quadrant operation available

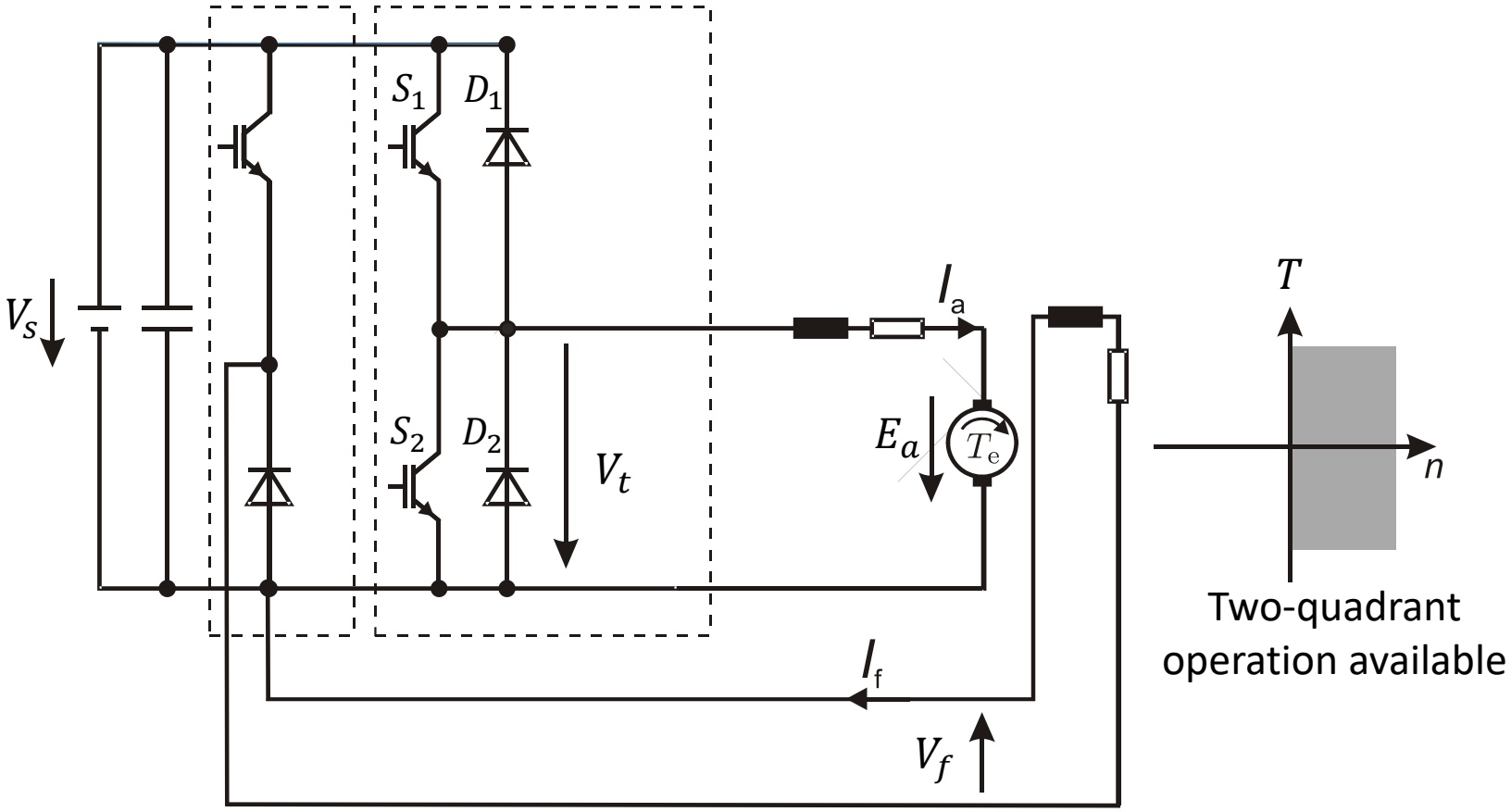
DC/DC Choppers - Boost Chopper



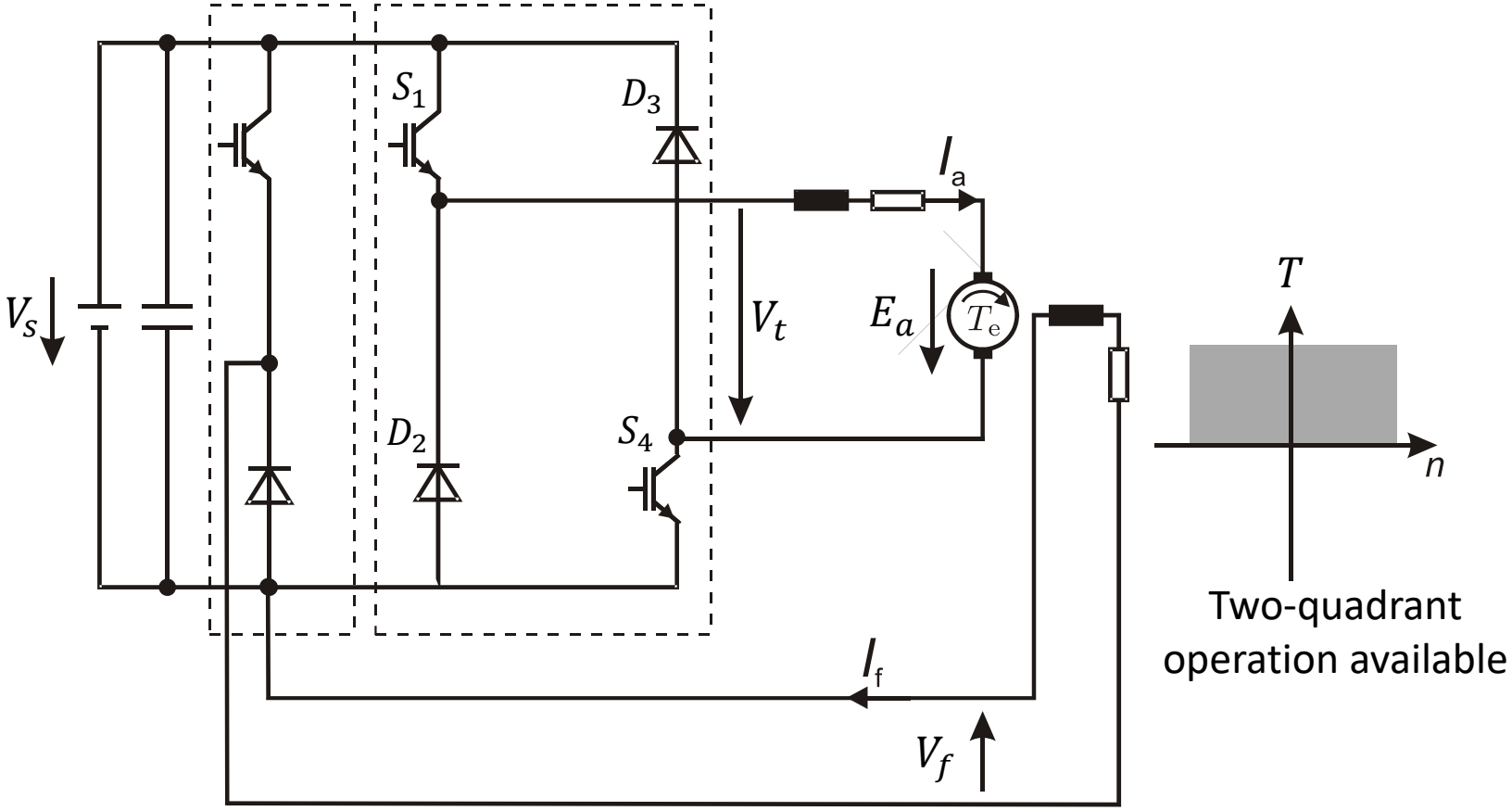


What happens if we reverse the field current?

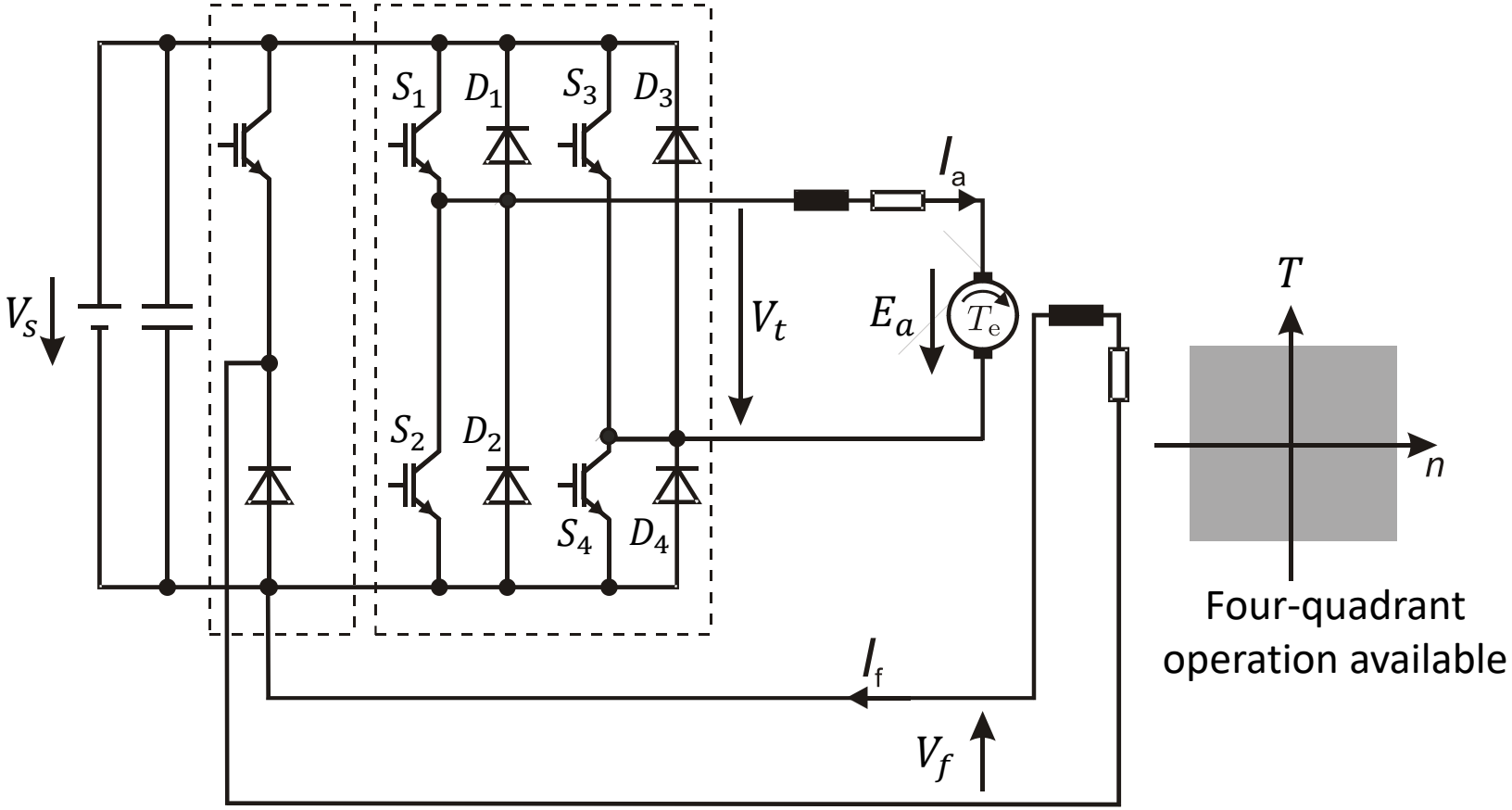
DC/DC Choppers – Half Bridge



DC/DC Choppers - 2-quadrant Converter

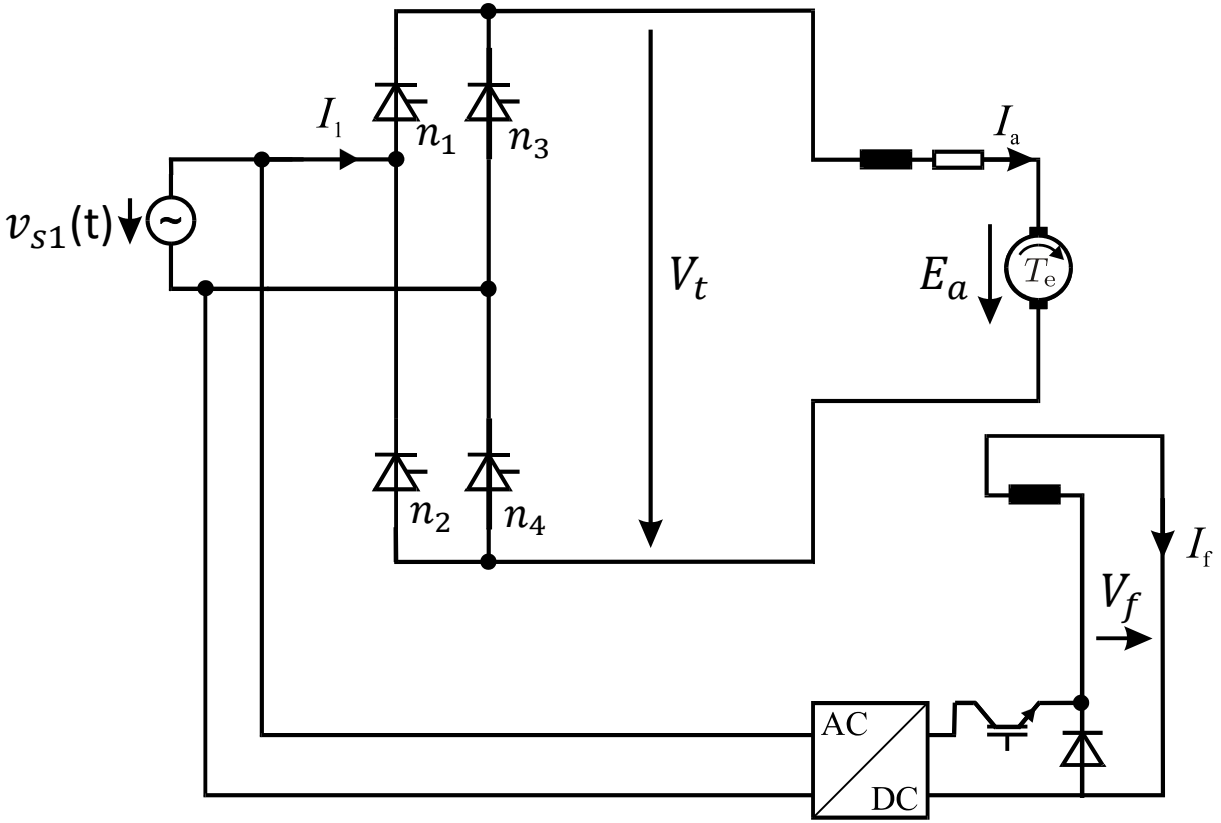


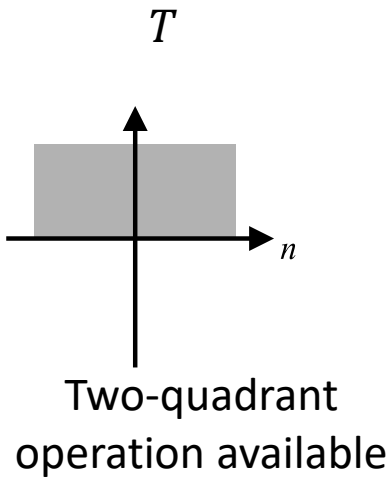
DC/DC Choppers – Full Bridge (H-Bridge)



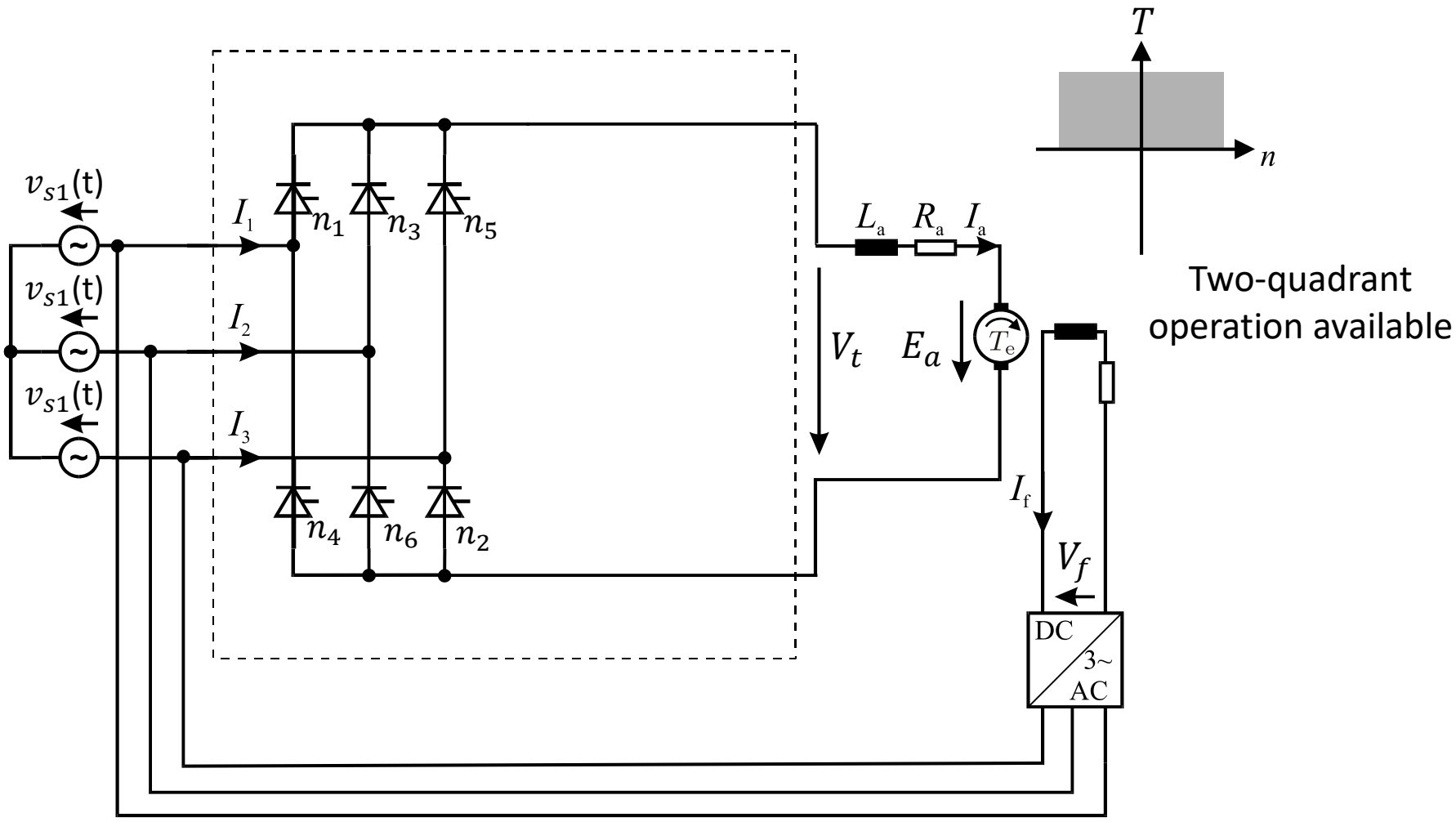
Please take notes!

AC/DC Rectifier - B2C-Bridge

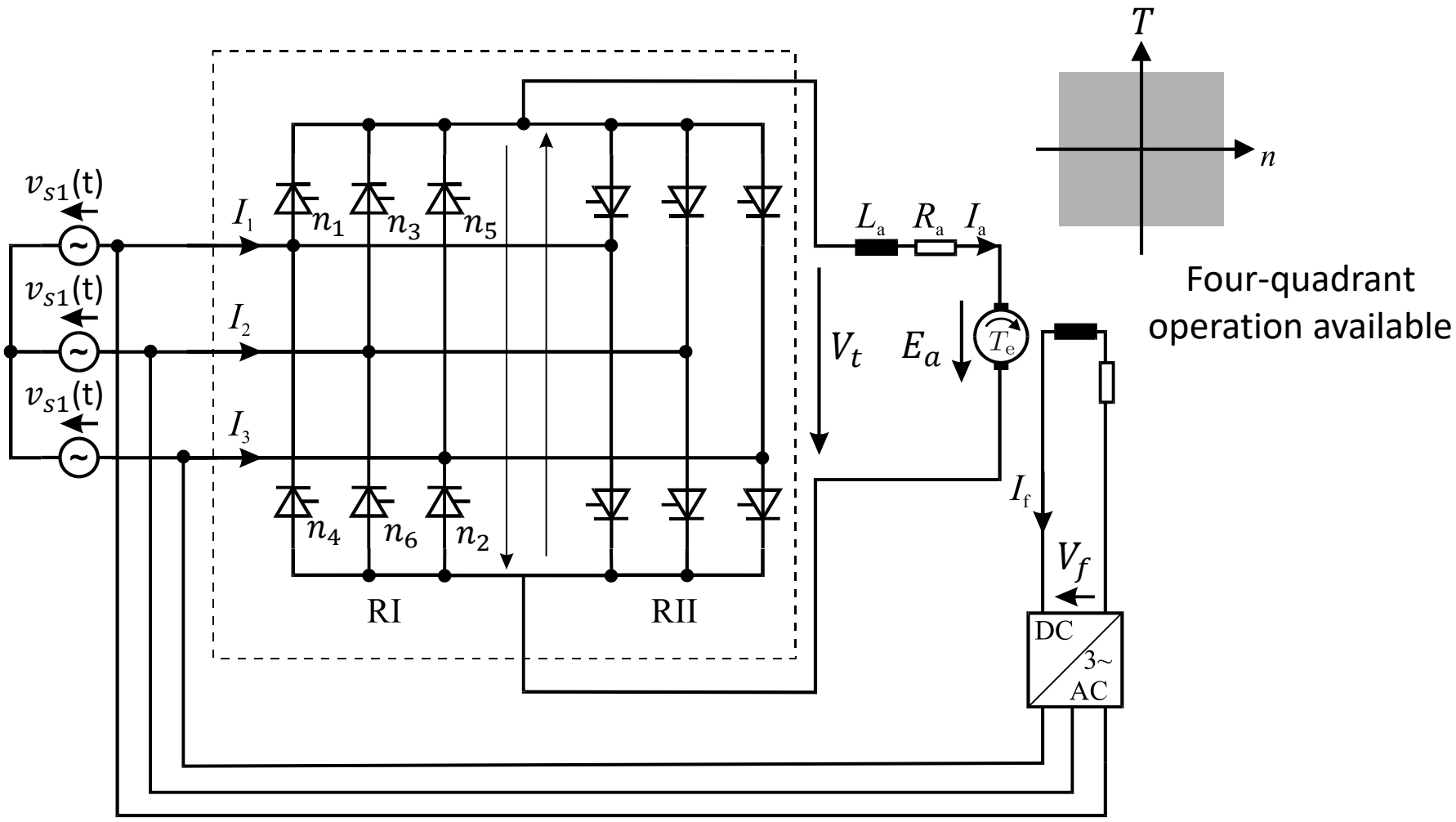




AC/DC Rectifier - B6C-Bridge

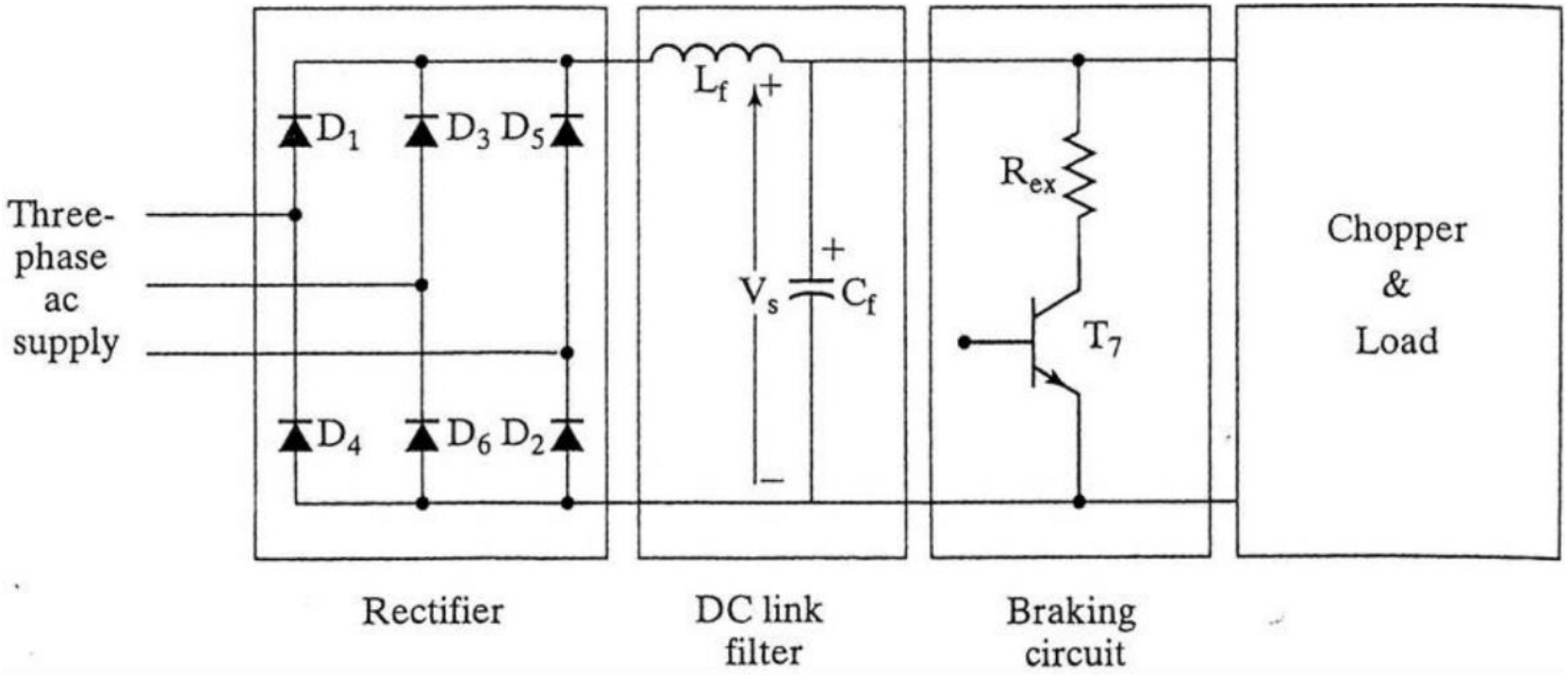


AC/DC Rectifier - Fully-controlled Bridge



Input to the Chopper

Diode Rectifier



Advantages:

- Near Unity Power Factor
- No Control Input

Disadvantages

- No Regenerative Braking

Input to the Chopper

Chopper with Regenerating Capability

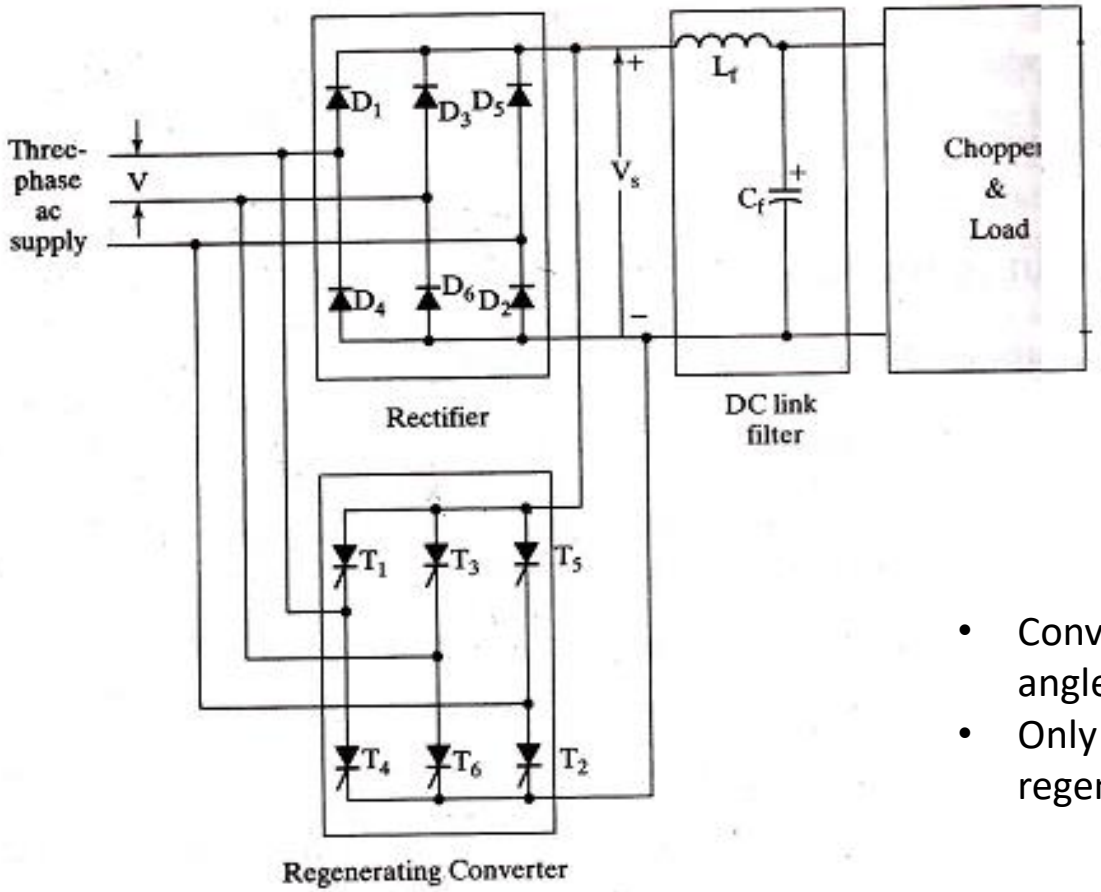


Figure 4.12 Chopper with regeneration capability

- Converter is operated with a firing angle close to 180 degree
- Only when V_s>1.35 V_{l-l} (rms) regenerating is possible

Braking Resistance

If we would like to implement electrical braking but our source is not capable of accepting power.

- Braking resistance for dynamic resistance should be added to the system.