EDUCATIONAL SYSTEM DRIVES FOR MACHINES

CONVERTER CONTROLLER CASSY

POSSIBLE APPLICATIONS

DRIVE FOR
DC MACHINE:

- Influence of pulse width and frequency on the armature voltage
- Speed control using armature voltage

DRIVE FOR
ASYNCHRONOUS MACHINE:

- Parametrisation of a frequency converter with V/F control
- Control optimisation of a cascade control with PID controllers

DRIVE FOR
SYNCHRONOUS MACHINES:

- Difference between the commutation methods
- Setup:
  - Permanently activated as BLDC drive
  - Externally activated with incremental commutation

CONCISE INFORMATION ON POWER ELECTRONICS IN THE DRIVE TECHNOLOGY

LD DIDACTIC has developed a compact didactical control unit with a power element to meet the necessary requirements of the increasing importance of electrical machines controlled via power electronics in the technical and educational sector. This unit is used to introduce the basic principles of modern technology.

In conjunction with electrical machines, the control unit (Converter Control CASSY) controls both drive systems for DC machines, asynchronous machines and synchronous machines.

In DC operating mode (H-bridge), variable DC voltages can be generated using pulse width modulation. This forms the basis of the DC drive for four quadrant operating mode. It is also possible to provide an overview of the setup of a cascade control for angle-oriented speed and position control.

Frequency and voltage-variable three-phase voltages can be generated as frequency converters for 3-phase asynchronous machines. A V/F function is used to analyse the modulation methods and frequencies.

Various commutators, such as block, sinus and incremental commutators, can be used to operate 3-phase synchronous machines and examine the differences between the commutator processes. The generated rotational movement and torque can be used to set up a permanently activated synchronous machine as a BLDC drive and a separately excited synchronous machine as a servo drive.

The Converter Controller CASSY finally comprises an integrated measuring unit. It is easy to measure the voltage between the phases of a frequency converter using this measuring device. By connecting the integrated, digital filter, it is possible to measure pulse width modulation variables.

DRIVES OF THE DC MACHINE

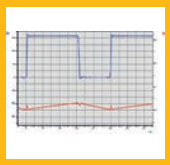
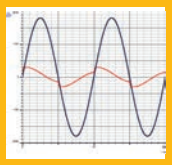
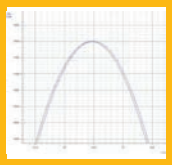





Fig. 1 *Fig. 2* *Fig. 3* *Fig. 4*

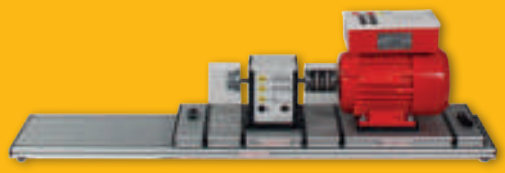
Fig. 1 *Pulse/width modulation*

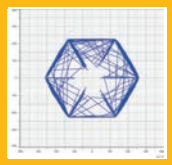
Fig. 2 *Dynamic speed control with sinusoidal reference variable*

Fig. 3 *Section from Figure 2*

Fig. 4 *Armature current over 4 quadrants*

DRIVES OF THE ASYNCHRONOUS MACHINE



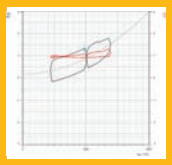


Fig. 1 *Fig. 2* *Fig. 3* *Fig. 4*

Fig. 1 *Current vector of a three-phase asynchronous machine without a filter*

Fig. 2 *Voltage vector of a three-phase asynchronous machine without a filter*

Fig. 3 *Torque characteristic curve during load simulation of a fan*

Fig. 4 *V/F characteristic curve during load simulation of a fan*

DRIVES OF THE SYNCHRONOUS MACHINE

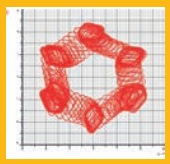
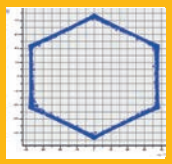
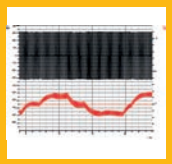




Fig. 1 *Fig. 2* *Fig. 3*

Fig. 1 *Current vector of a block commutation*

Fig. 2 *Voltage vector of a block commutation*

Fig. 3 *Voltage and current of a block commutated, permanently activated synchronous machine*