

Experiment 3: Rectifiers

Student Group

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Experiment 3: Rectifiers

Objectives of the experiment

Getting to know the following components

- Half-wave rectifier, bridge rectifier
- Ripple voltage
- Fixed voltage regulator
- Three-phase AC, three-phase bridge rectifier

Applying

- Voltage analysis in the time domain using a simulation program

Preparation for the lab

in the ILIAS course

Read the documents for Experiment 3 here.

These will be made public one week before the experiment.

Preparation for the oral short test

For this experiment you should

1. be able to apply and explain the following concepts:
 1. Characteristic curve of an ideal and a real diode
 2. Structure and physical operating principle of a diode
 3. Half-wave and bridge rectifier circuit
 1. Structure
 2. Differences when using ideal vs. real diodes
 3. Output voltage for a given input voltage
 4. Reason and function of the additional capacitor
 5. Applications
 4. Graphical and analytical determination of characteristic values of a periodic signal, e.g.
 1. Amplitude, peak-to-peak value
 2. Period, frequency, angular frequency
 3. DC component, rectified average value, RMS value,
 4. Zero-phase angle (leading? lagging?)
 5. Graphical and analytical use of multiple sinusoidal signals, e.g.
 1. Phase shift,
 2. Addition in the time domain and phasor diagram

An interactive visualization of a full-bridge rectifier can be found here.

Fig. 21: Simulation of an Inverter

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