

# Experiment 3: Rectifiers

## Student Group

First Name	Surname	Matrikel Nr.

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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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