

Experiment 5: Operational Amplifier

Student Group

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Experiment 5: Operational Amplifier

- Circuits on the breadboard
- Integrator
- Non-inverting Schmitt trigger
- Triangle-square-wave generator
- Pulse-width modulation and control of a DC motor

Preparation for the laboratory

in the ILIAS course

Read the materials for Experiment 5 here.
They will be published one week before the experiment.

Preparation for the oral short exam

For this experiment, you should be able to apply and explain the following concepts:

1. "golden rules" for the negatively feedback, idealized operational amplifier
2. deviating properties of the real operational amplifier (e.g., output swing range, slew rate)
3. output-voltage waveform U_A of the inverting integrator (inverting integrator) for different input voltages U_E , e.g.
 1. DC voltage
 2. square-wave voltage
 3. arbitrary voltage waveform
4. integration time constant of the inverting integrator
5. Schmitt trigger
 1. difference in feedback compared to the inverting integrator
 2. idealized relationship between U_E and U_A
 3. idealized line diagram: U_E and U_A as a function of time
 4. switching thresholds
 5. threshold voltage
 6. hysteresis
 7. real behavior: output "in saturation"
6. structure of the triangle-square-wave generator

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