Power Electronics and Control Group

The research team works in different R&D groups. Power electronics, electrical drives as well as control engineering are the main research areas of the department.

Scopes:

Drive Engineering

- digital control of asynchronous and synchronous machines as well as brushless d.c. machines
- digital control of linear drives
- analysis and development of control algorithms for sensorless and adaptive control

Converter Technology

- control methods for power electronic switches
- analysis of converter topologies for technological applications
- SMPS
- EMI optimization
- converter design

Microcomputer Applications

- 8bit, 16bit, 32bit
- digital signal processors (DSP)
- FPGA design

Modelling/Simulation

- model levels for power electronic switches
- simulation of converter topologies
- simulation of control loop structures

Power Quality

- active filters
- dynamic reactive power compensation
- harmonics compensation

Power Electronics and Electrical Drive Engineering Lab

Industrial Electronics Group

The term "Industrial Electronics" refers to systems engineering as a whole, consisting of electrical hardware and software components in connection with specific process parameters which provide the basis for the realisation of industrial manufacturing technologies, handling and processing technologies.

Scopes:

Power semiconductor applications

- characterisation, test and application of power electronic components and power semiconductor devices
- drive and protection of power semiconductor devices

Technological switched mode power supplies

- design of high power supplies for electro-process technologies
- high current applications (induction heating, electroplating, et al.)
- high voltage applications (X-ray, corona, ozone, plasma, laser, et al.)
- high frequency applications (induction heating, X-ray, et al.)

Overall system approach

- application technology – physical process – energy conversion process – optimised power supply – system integration – digitalisation

The Industrial Electronics Group is a member of "Thuringian Center of Innovation in Mobility – ThIMo".

Highly equipped special labs

The following equipment is available for teaching and research:

- Power Electronics Labs
- Electrical Drive Engineering Labs
- Electrical Machines Labs
- Power Semiconductor Device Test Labs
- Computer Simulation Labs