E6.3.4
SYSTEMS & COMPONENTS
OF CONTROL ENGINEERING

E6.3.4.3
Fuzzy Control

E6.3.4.4
Frequency Response &
Controller Design

E6.3.4.5
Stability & Optimisation

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**Fuzzy Control**
Fuzzy logic is a technology for controlling and regulating technical systems without mathematical modelling. With fuzzy logic, control strategies are simply defined with colloquial elements. To formulate the control-related problems in the form of linguistic (= language) rules, physical input variables (e.g. Temperature) are fuzzified, meaning converted from a crisp to a fuzzy value using a membership function.

**Frequency Response & Controller Design**
The frequency response of a system is usually illustrated graphically, for which there are two different graphing methods called the Bode plot and the Nyquist plot. With this setup, frequency responses of real transfer components are measured and recorded. For a PT3 controlled system, a PI controller is designed in accordance with the compensation method. In the Bode diagram, the stability of the closed control circuit is determined from the phase margin of the open circuit.

**Stability & Optimisation**
Investigating stability and optimising controlled systems are two of the most important tasks related to control engineering. The result decides the usability of the controller for the intended purpose. Experiments are operated and evaluated with CASSY Lab 2 and WinFACT.