Valid from 2024.HS

Module description: Control Engineering Fundamentals

Module Code	t.BA.XX.RT.19HS
ECTS Credits	4
Language of Instruction/Examination	German
Organizational Unit	IMS
Module Coordinator	Konrad Stadler
Legal Framework	The module description is part of the legal basis in addition to the general academic regulations. It is binding. During the first week of the semester a written and communicated supplement can specify the module description in more detail.
Module Characteristic	Type 3b 2 lecture lessons per semester week and class+ 4 lab bi-weekly lessons per semester and half-class
Module Description	Students are able to analyse and interprete closed loop dynamic systems in the time and frequency domain.
Module Content	**Lecture:** **Laplace transformation focusing on transfer function, pole zero map and time and frequency behaviour.** **System representation as block diagrams and block diagram algebra.** **Feedback and difference between open loop and closed loop.** **Modelling of dynamic systems.** **Stability of linear time invariant systems.** **Design of PID controller** **Frequency response method** **Laboratory course:** **Specific experiments are conducted by the students to reinforce their understanding of the theoretical concepts.**
Prerequisite Knowledge	Signals and systems

Learning Objectives (Competences)

Students...	Competencies	Taxonomies
Students can assess the stability of systems in the time and in the frequency domain.	F, M	K3
Students are able to describe dynamic systems based on first principles and can derive a mathematical model of the system.	F, M	K3
Students understand the concept of feedback.	M, F	K3
Students can understand and apply basic methods to design PID controllers.	M, F	K3

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Performance Assessment

End-of-module exam	Assessment	Length (min.)	Weighting	Form
written exam	Grade	90	80	acc. to module agreement

Performance assessment during the semester	Assessment	Length (min.)	Weighting	Form
written exam	Grade	45	20	acc. to module agreement

Classroom Attendance Requirement

None

The labs are compulsory.

Learning material

- Franklin, G. & Powell, J. & Emami-Naeini, A. (2020). Feedback control of dynamic systems. 8. Edition. Harlow, England : Pearson Education Limited. ISBN 9781292274522 .
- Lecture notes
- Zacher , S. & Reuter , M. (2022). Regelungstechnik für Ingenieure: Analyse, Simulation und Entwurf von Regelkreisen. 16 Edition. Springer. ISBN 9783658364069.
- Lunze, J. (2020). Regelungstechnik 1: Systemtheoretische Grundlagen, Analyse und Entwurf einschleifiger Regelungen . 12 Edition. Berlin Heidelberg: Springer . ISBN 9783662607459.

Comments

Labs are compulsory!