Technology
Arts Sciences
TH Köln

Course
ZR - State Space Control

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General information

Long name	State Space Control
Approving CModule	ZR_MaET
Responsible	Prof. Dr. Norbert Große Professor Fakultät IME
Level	Master
Semester in the year	winter semester
Duration	Semester
Hours in self-study	78
ECTS	5
Professors	Prof. Dr. Norbert Große Professor Fakultät IME
Requirements	Basics of control engineering differential equations, Laplace transformation, frequency domain; Matrix calculation
Language	German
Separate final exam	Yes

Final exam

Details

Written exam, similar to the exercises; Support by means of matrix calculation software Scilab. Comprehension questions.

Minimum standard

Achieving half of the possible points

Exam Type

Written exam, similar to the exercises; Support by means of matrix calculation software Scilab. Comprehension questions.

Lecture / Exercises

Learning goals

Knowledge

Sampling, quantization describe

escribe time-discrete systems in the time domain

Describe time-discrete systems in the frequency domain

Analyze the stability and position of the poles of the transfer function

tate space description of a system
Describe time-continuously
Describe time-discretely

Transform to normal forms

Determine stability, controllability, observability

Design state space controller according to pole asignment

Design optimal state space controller

Prefilter and noise compensation design

Design of observers with pole placement

Design of optimal observers

Skills

Create models from a physical perspective

Select suitable state variables

Perform simulation of dynamic systems

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Exercises (whole course)	1
Exercises (shared course)	0
Tutorial (voluntary)	0

Separate exam

Exam Type

solving exercises within limited functional / methodical scope under examination conditions

Details

Exam with tasks to be calculated, use of the software Scilab; comprehension questions

Minimum standard

Achieving half of the possible points

Practical training

Learning goals

Skills

Use spreadsheet programs for difference equations

Use matrix calculation programs

Perform simulation of dynamic systems

Review design of complex dynamic systems

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	1

Tutorial (voluntary)	0

Separate exam

Exam Type

solving exercises within limited functional / methodical scope

Details

Face-to-face and self-learning exercises; edit two larger tasks using spreadsheet software and Scilab; create a documentation for this

Minimum standard

error-free solving of the two specified tasks