
Modulbezeichnung: Dynamical Systems and Control (DSC) 5 ECTS
 (Dynamical Systems and Control)

Modulverantwortliche/r: Knut Graichen

Lehrende: Maximilian Pierer von Esch, Andreas Völz

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| Startsemester: WS 2022/2023 | Dauer: 1 Semester | Turnus: jährlich (SS) |
| Präsenzzeit: 60 Std. | Eigenstudium: 90 Std. | Sprache: Englisch |

Lehrveranstaltungen:

Dynamical Systems and Control (WS 2022/2023, Vorlesung, Knut Graichen et al.)

Empfohlene Voraussetzungen:

Basic knowledge of advanced mathematics

Inhalt:

This course introduces the fundamentals of dynamical systems and control design with a focus on linear single-input single-output system. The course covers the following topics:

- Dynamical systems: state space formulation, physical examples, linearization
- Frequency domain: Laplace transform, analysis and control based on transfer functions
- Time domain: analysis, control and observer design based on state space models

Lernziele und Kompetenzen:

The students will be able to

- describe dynamical systems by differential equations
- compute a linearized model for nonlinear systems
- describe and analyze dynamical systems in the Laplace domain
- design basic controllers in the Laplace domain
- describe and analyze dynamical systems in the state space
- design basic controllers and observers in the state space

Literatur:

- K.J. Aström and R.M. Murray: Feedback systems - An Introduction for Scientists and Engineers, Princeton University Press, 2008.
 - E. Hendricks, O. Jannerup, and P.H. Sørensen: Linear systems control: deterministic and stochastic methods, Springer, 2008.
 - L. Padulo and M.A. Arbib: System Theory, W.B. Saunders Company, 1974.
 - G.C. Goodwin, S.F. Graebe and M.E. Salgado: Control System Design, Prentice Hall, 2001.
 - W.J. Rugh: Linear System Theory, Prentice Hall, 1996.
 - C.T. Chen: Control System Design, Pond Woods Press, 1987.
 - T. Kailath: Linear Systems, Prentice Hall, 1980.
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Studien-/Prüfungsleistungen:

(Prüfungsnummer: 479255)

(englische Bezeichnung: Dynamical Systems and Control)

mündliche Prüfung, Dauer (in Minuten): 30 Prüfungssprache: Englisch

Erstablingung: WS 2022/2023, 1. Wdh.: SS 2023

1. Prüfer: Knut Graichen

Organisatorisches:

In the winter semester 2022/2023, this module is offered exclusively as conditional subject for Medical Engineering students majoring in Medical Robotics. Material for self-study can be found in the StudOn course.