Praktikum MATLAB®/Simulink®I

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Author Information

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Course Details

Description

This is an introductory course for MATLAB/Simulink for control engineering students. The problems solved within this course using MATLAB/Simulink are simple modelling and control synthesis tasks.

Course Contents

Week 1

- Topic
    - General introduction to MATLAB
    - Basic commands
    - Calculus
    - Matrix operations
    - Vector operations

- Materials
    - Prework reading
    - Preparatory homework
    - Problem set for lab class
    - Solutions

Week 2

- Topic
    - MATLAB files
    - Graphs in MATLAB
    - Debugger

- Materials

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- o Prework reading
- o Preparatory homework
- o Problem set for lab class
- o Solutions

Week 3

- Topic
  - o Introduction to differential equations
  - o Solving differential equations with MATLAB

- Materials
  - o Prework reading
  - o Preparatory homework
  - o Problem set for lab class
  - o Template MATLAB files for tasks
  - o Solutions

Week 4

- Topic
  - o Introduction to helicopter model
  - o Parameters and units
  - o Additional important commands

- Materials
  - o Prework reading
  - o Preparatory homework
  - o Problem set for lab class
  - o Template MATLAB files for tasks
  - o Solutions

Week 4

- Topic
  - o Introduction to helicopter model
  - o Parameters and units
  - o Additional important commands
  - o System description (plant model)
  - o Analysis of controlled system
  - o Controller design

- Materials

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- o Prework reading
- o Preparatory homework
- o Problem set for lab class
- o Template MATLAB files for tasks
- o Solutions

Week 5

- Topic
  - o Short introduction to Simulink
  - o Fan control with Simulink
  - o Helicopter model control with Simulink

- Materials
  - o Prework reading
  - o Preparatory homework
  - o Problem set for lab class
  - o Template MATLAB files for tasks
  - o Solutions

Week 6

- Topic
  - o Root locus analysis
  - o SISO Design Tool
  - o System analysis and parameter manipulation

- Materials
  - o Prework reading
  - o Preparatory homework
  - o Problem set for lab class
  - o Template MATLAB files for tasks
  - o Solutions

Reading

[1] **Prof. Dr.-Ing. J. Adamy**
Systemdynamik und Regelungstechnik II
TU-Darmstadt: Institut für Automatisierungstechnik und Mechatronik, 2012
[2] **Prof. Dr.-Ing. U. Konigorski**
Systemdynamik und Regelungstechnik I
TU-Darmstadt: Institut für Automatisierungstechnik und Mechatronik, WS 2012/2013
[3] **W. D. Pietruszka**

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MATLAB und Simulink in der Ingenieurspraxis; Modellbildung, Berechnung und Simulation
Wiesbaden: Teubner, 2. Aufl. 2006

[4] **Stoer, J. und Burlisch, R.**
Numerische Mathematik 2, Springer, 2005

Links

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http://www.rtm.tu-darmstadt.de/rtm_lehre/praktika_3/rtm_lehre_praktikum_matlab_1/index.de.jsp

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