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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
  + Prework reading
  + Preparatory homework
  + Problem set for lab class
  + Solutions

**Week 3**

* Topic
  + Introduction to differential equations
  + Solving differential equations with MATLAB
* Materials
  + Prework reading
  + Preparatory homework
  + Problem set for lab class
  + Template MATLAB files for tasks
  + Solutions

**Week 4**

* Topic
  + Introduction to helicopter model
  + Parameters and units
  + Additional important commands
* Materials
  + Prework reading
  + Preparatory homework
  + Problem set for lab class
  + Template MATLAB files for tasks
  + Solutions

**Week 4**

* Topic
  + Introduction to helicopter model
  + Parameters and units
  + Additional important commands
  + System description (plant model)
  + Analysis of controlled system
  + Controller design
* Materials
  + Prework reading
  + Preparatory homework
  + Problem set for lab class
  + Template MATLAB files for tasks
  + Solutions

**Week 5**

* Topic
  + Short introduction to Simulink
  + Fan control with Simulink
  + Helicopter model control with Simulink
* Materials
  + Prework reading
  + Preparatory homework
  + Problem set for lab class
  + Template MATLAB files for tasks
  + Solutions

**Week 6**

* Topic
  + Root locus analysis
  + SISO Design Tool
  + System analysis and parameter manipulation
* Materials
  + Prework reading
  + Preparatory homework
  + Problem set for lab class
  + Template MATLAB files for tasks
  + 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**

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

**Praktikum MATLAB/Simulink I**

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

  
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