

Simulation and Modeling I

WS 2016/2017

Contents and Organization

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Informatik 7 (Rechnernetze und Kommunikationssysteme)



Audience, Language, Lecturer

■ Audience

- computational engineering, bachelor/master
- computer science (Informatik)
- mechanical engineering (Maschinenbau)
- ...

■ Language

- lectures (Vorlesungen) and exercise classes (Übungen) are given in English (individual conversation in German always possible)
- all material is in English

■ Lecturer

- Prof. Dr.-Ing. Reinhard German
- exercise classes + supervised computer hours: Vitali Schneider

■ Link

- <http://www7.cs.fau.de/en/teaching/sm1-2016w/>

Contents

Lectures

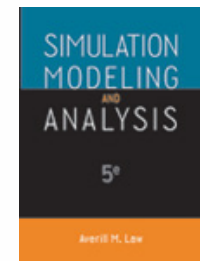
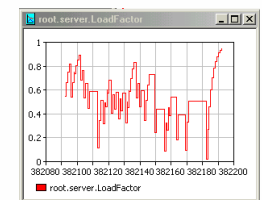
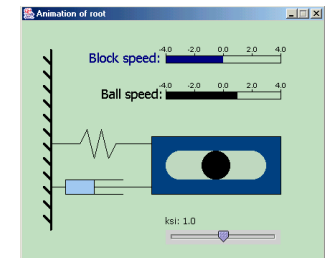
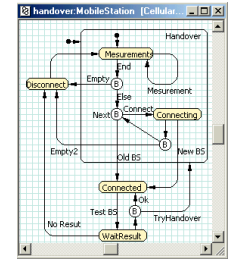
- Introduction to Simulation
- Discrete Simulation
- Analytical Modeling
- Modeling Paradigms (e.g., event/process oriented, queueing systems, Petri nets, UML statecharts)
- Input Modeling (e.g., Distribution Fitting)
- Random Number Generation
- Output Analysis
- Continuous and Hybrid Simulation
- Simulation Software

Exercises

- Refresher on Probability Theory (as needed for Simulation)
- Practical experience with various simulation tools

Sources

- Averill Law: "Simulation Modeling and Analysis", 5th ed., McGraw Hill, 2014
- Additional material can be found on the homepage



Contents (cont.)

- Exercise classes, supervised computer hours
 - exercises on Monday or Thursday
 - practice of theory, usage of various tools
 - exercise classes for preparation of assignments
 - partly used as supervised computer hours
 - work on assignments in teams of two or three
- 7 Assignments
 - Computing with probabilities I, II
 - Modeling in UML with AnyLogic / Coding simulation with SSJ
 - Petri net modeling
 - Data measurements and distribution fitting with ExpertFit
 - Simulation control in AnyLogic
 - Hybrid simulation with AnyLogic
- Supervised computer hours
 - you may practice yourself or in teams
 - in case of questions you may contact the teaching assistant

Contents (cont.)

■ Simulation and Modeling II in summer semester

- Project-oriented: teams of three/four
 - project management, presentation, documentation, case studies
 - advanced topics: parallel and distributed simulation, variance reduction techniques, rare event simulation
- Simulation projects
 - former projects: traffic intersection, gas station, bus line, street/garden cafe, university cafeteria, supermarket, drinks terminal, Ferris wheel at Bergkirchweih, ambulance station, smartphone energy management, energy costs for houses with photovoltaics and battery, energy demand of plug-in-hybrid vehicles, industrial Ethernet ...
 - own project ideas are possible

Organization

■ Lectures: **Tuesday, 14:15-15:45, H16** (Cauerstraße 7/9)

■ Exercise classes, computer hours

- exercise classes:

Monday, 12:15 - 13:45 or **Thursday, 16:00-17:30** (room **01.153-113**)

supervised computer hours:

Thursday, 14:15-15:45, room **01.153-113**

- or change times?

- starting next week

- **please register yourself for one of the exercise classes online via StudOn**

registration begins on **October 19** at **10 AM**

Organization (cont.)

■ Examinations

- all assignments successfully completed
- oral (30 minutes)/written (90 minutes) examination after semester
- and on demand written certifications with or without grade

Questions?

Combination with other lectures at Informatik 7

