Stochastics II
Summer 2015

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Place: Arnimallee 6
Lectures: Tuesday (SR 007/008) and Thursday (SR 025/026), 08:00-10:00.
Exercises: Wednesday (SR 007/008) 12:00-14:00.
Office Hours: Tuesday 10:00-12:00 in the instructor's office. Meetings can be also arranged by appointment.

Topics of the course

- Measure theory and the Lebesgue integral.
- Convergence of random variables and 0-1 laws.
- Generating functions: Branching processes and characteristic functions.
- Markov chains.
- Introduction to martingales.

Requirement for active participation at the exercises

- There will be 12 sheets of exercises.
- You should try to solve and write up all exercises for yourself, because you will find some of them on the final exam. Each week submit solutions for *two* exercises, those you would want to be corrected.
- For the signature on the exercises you must achieve 60 % of the total score (for each exercise the same score will be given). This means that each person must have $20\,\text{points} \times 12\,\text{sheets} \times 0,6 = 144$ points to be able to do the final exam.
- You will have two weeks to think about each sheet. The new exercise sheet will normally be placed weekly on the web shortly after the end of the second lecture. You should submit your solutions until the end of the appropriate Tuesday lecture. It is not possible to submit the solutions later.
- It would be great if you thought about and discussed the exercises in small groups (2 people). At the beginning of each solution note the name of the person who wrote it up; every student must write up at least *eight* times.
- Furthermore, each student must present at least *once* a correct solution at the board.

In conclusion, for the exercise session credit you need to full each of the following:

- achieving at least 144 points from homework problems,
- writing up the solutions yourself at least *eight* times (besides writing the name of the two authors, on each solution you should state who the scriber was),
- presenting at least once a correct solution on the board.

Final: the grade for the course is based solely on the final exam. The final takes place on **July 21st, 9:00-12:00** at Arnimallee 6, SR 032. The make-up final exam will be on **September 15th, 9:00-12:00** at Arnimallee 6, SR 032.

There will be three different type of exercises at the final:

- Definitions, statement and proofs of theorems: you should know all the material presented at the lectures.
- Problems from the exercise sheets: you should know how to solve all homework exercises.
- New problems: you should be able to apply the encountered theorems and methods to solve exercises you have possibly never seen.

Bibliography: The following books will be used as basic bibliography for the course:

[1] Bartle, R.: The Elements of Integration and Lebesgue Measure, 1995.

[2] Grimmett, G. R. and Stirzaker, D. R. Probability and Random Processes, 2001.

[3] Meintrup, D., Schffler, S.: Stochastik: Theorie und Anwendungen, 2005.

[4] Varadhan, S.: Probability Theory, 2001.

[5] Stroock, D. : An introduction to Markov Processes, 2005.

The main reference for the first part of the book will be [1]. For the rest of the course, we will use [2] as a reference book.