

Block course: Empirical processes

by

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August 15-18 and 21-24, 2017

Venue: Institute for Mathematical Stochastics, Goldschmidtstr. 7, SR 5.101

Contents:

In modern nonparametric statistics, empirical processes have become an indispensable tool for researchers. This course presents some of the main ideas and techniques. It is intended for Ph.D. and M.Sc. students in Mathematics and Statistics and follows mostly the lecture notes "Empirische Prozesse" (Lutz Dümbgen, Bern 2010), complemented by some research papers.

Tentative schedule:

- **Morning session(s): 10:15-11:00 and 11:15-12:00, mostly lectures**
- **Afternoon session: 17:15-18:00, mostly exercises**

DAY 1 (August 15)

- Introduction: Empirical processes, partial sum processes, general setting
- Symmetrizations
- Finite approximations
- More about uniform order statistics

DAY 2 (August 16)

- Exponential inequalities
- Concentration of measure

DAY 3 (August 17)

- Glivenko-Cantelli classes
- Vapnik-Cervonenkis classes
- Covering numbers

DAY 4 (August 18)

- An abstract law of large numbers
- Function classes and uniform covering numbers
- Random signed measures

DAY 5 (August 21)

- Convergence in distribution (Hoffman-Jorgensens's approach)
- Function spaces
- Brownian motion and Brownian bridge

DAY 6 (August 22)

- Chaining and maximal inequalities
- Functional central limit theorems

DAY 7 (August 23)

- Combinatorial stochastic processes
- Laws of the iterated logarithm

DAY 8 (August 24)

- Selected topics, applications, refinements... (no afternoon session on the last day)

The principal investigators of RTG 2088 invite you to participate.