

Markov Processes & Monte Carlo Methods

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Fridays 14-16, Room 0.011

Markov chain based Monte Carlo methods (MCMC) are widely used in application areas including Bayesian statistics, statistical physics, filtering etc. In most practically relevant cases, the methods applied are not really well-understood mathematically in the sense that there are no feasible error bounds. Nevertheless, there is a rapidly growing number of mathematical results related to MCMC, reaching from rigorous bounds in specific models over asymptotic statements to more conceptual results. These are related to a variety of areas in probability and stochastic analysis including convergence to equilibrium of Markov processes, couplings, functional inequalities, interacting particle systems and scaling limits, phase transitions, diffusion limits, and numerical methods for stochastic differential equations.

In the seminar, we introduce some of the most important MCMC methods, and we study related mathematical theory where it is available. We will also consider some topics from machine learning and stochastic optimization.

Prerequisites: „Stochastic Processes“ (For some of the talks additional background on Markov processes and/or Stochastic Analysis is required)

Preliminary meeting 25.7.2017, 17.30 s.t., N0.008