Curriculum STK2130-sp19

Textbook: Sheldon M. Ross Introduction to Probability models, 11th ed. (2014) Academic Press, Elsevier.

Lectures

Chapters 1-3: Only 2.9, excluding example 2.53, is formal curriculum, but results referred to in later chapters are assumed known.

Chapter 4 Markov chains in discrete time

- 4.1 Introduction
- 4.2: Chapman-Kolmogorov equations.
- 4.3: classification of states, until page 199 on symmetric random walk in two dimensions.
- 4.4: except examples 4.24, 4.25 and 4.26.
- 4.5.1: the gambler's ruin problem.
- 4.6 mean time spent in transitional states.
- 4.7: branching processes.
- 4.8: time reversible Markov chains, until example 4.35.
- 4.9: Markov chain Monte Carlo methods, page 247-249 including example 4.39, i. e. until middle of page 249.

Chapter 5: Exponential distribution, Poisson process

- 5.1: Introduction
- 5.2: the exponential distribution, not examples 5.1, 5.5, 5.7, 5.9 and 5.10.
- 5.3: the Poisson process, not examples 5.19, 5.20 and 5.22 and subsection 5.3.6.
- 5.4: generalizations of the Poisson process, not subsection 5.4.3.

Chapter 6: Continuous time Markov chains

- 6.1: Introduction
- 6.2: continuous time Markov chains.
- 6.3: birth and death processes
- 6.4: the transition probability function
- 6.5: limiting Probabilities
- 6.8: uniformization
- 6.9: computing of transition probabilities

Chapter 7: Renewal theory

- 7.1 Introduction
- 7.2: distribution of N(t)

Chapter 10:

- 10.1: Brownian motion
- 10.2: hitting times, maximum variable and gambler's ruin problem.
- 10.3: Variations on Brownian motion.

In addition all assigned problems and the mandatory assignment are part of the curriculum.