

Lecture plan

Week 3

- [Lecture 1:](#)
 - Ch. 2.9: Intro to stochastic processes (excluding example 2.53)
 - Start ch. 4.1: Introduction to Markov chains
- Lecture 2:
 - Finish ch. 4.1
 - Ch. 4.2: Chapman-Kolmogorov equations (excluding pages 193-194, including the Remark on page 194)
- [Lecture 3:](#)
 - Ch. 4.3: Classification of states (excluding the last part of 4.3 from the last 1/3 of page 199, from random-walk in 2 dimensions)
 - Ch. 4.4: Long-run proportions and limiting probabilities
- [Lecture 4:](#)
 - Finish ch. 4.4 (excluding examples 4.24, 4.25, 4.26)
 - Ch. 4.5.1: The gambler's ruin problem
- [Lecture 5:](#)
 - Ch. 4.6: Mean time spent in transient states
 - Ch. 4.7: Branching processes
- [Lecture 6:](#)
 - Ch. 4.8: Time reversible Markov chains (until example 4.35)
 - Ch. 4.9: Markov Chain Monte Carlo Methods (until example 4.39), with [R examples](#)
- [Lecture 7:](#)
 - Ch. 5.2.1: The exponential distribution (excluding example 5.1)
 - Ch. 5.2.2: Properties of the exponential distribution (excluding example 5.5)
- [Lecture 8:](#)
 - Ch. 5.2.3: Further properties of the exponential distribution (excluding examples 5.7, 5.9 and 5.10)
 - Ch. 5.2.4: Convolutions of the exponential random variables (excluding example 5.11)

- [Lecture 9:](#)
 - Ch. 5.3.1: Counting Processes
 - Ch. 5.3.2: Definition of the Poisson Process
 - Ch. 5.3.3: Interarrival and Waiting Time Distributions

- [Lecture 10:](#)
 - Ch. 5.3.4: Further Properties of Poisson Processes (until example 5.16)
 - Ch. 5.3.5: Conditional Distribution of the Arrival Times

- [Lecture 11:](#)
 - Finish Ch. 5.3.5 (excluding examples 5.19, 5.20, 5.21, 5.22)
 - Start Ch. 5.4.1: Nonhomogeneous Poisson Process

- [Lecture 12:](#)
 - Finish Ch. 5.4.1
 - Ch. 5.4.2: Compound Poisson Processes

- [Lecture 13:](#)
 - Ch. 6.1: Introduction to Continuous-time Markov chains
 - Ch. 6.2: Continuous-time Markov chains
 - Ch. 6.3: Birth and Death Processes

- [Lecture 14:](#)
 - Finish Ch. 6.3
 - Ch. 6.4: The Transition Probability Function $P_{ij}(t)$

- [Lecture 15:](#)
 - Finish Ch. 6.4

- [Lecture 16:](#)
 - Ch. 6.5: Limiting Probabilities (excluding Example 6.16)
 - Ch. 6.8: Uniformization

- [Lecture 17:](#)
 - Ch. 6.9: Computing the Transition Probabilities
 - Ch. 7.1: Renewal Process
 - Ch. 7.2: Distribution of $N(t)$

■ [Lecture 18:](#)

- Ch. 10.1: Brownian Motion
- Ch. 10.2: Hitting Times, Maximum Variable, and the Gambler's Ruin Problem
- Ch. 10.3: Variations on Brownian Motion

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