



Syllabus 2017 Computer and Mathematical Sciences Probabilistic Models

Japanese

Basic information

held this year:	yes
instructor(s)	Nobuaki Obata
room	Large Lecture Room
schedule	The latter period (Friday) 8:50–10:20
begins on:	10/06

Objectives and outline

Probability models are essential in mathematical analysis of random phenomena. In these lectures, we focus on Markov chains as basic models of random time evolution. Starting with fundamental concepts in probability theory (random variables, probability distributions, etc.), we study fundamentals on Markov chains (transition probability, recurrence, stationary distributions, etc.). Moreover, we overview random walks, birth-and-death processes and Poisson processes, and their wide applications. Background knowledge on elementary probability is required.

Class plan

1. Introduction
2. Random variables and probability distributions
3. Independence and dependence
4. Markov chains
5. Transition matrices
6. Stationary distributions
7. Topics in Markov chains I
8. Topics in Markov chains II
9. Topics in random walks I
10. Topics in random walks II
11. Galton–Watson branching processes
12. Poisson processes
13. Queuing theory
14. Brownian motion – An intuitive introduction
15. Summary

Evaluation

Submission of a report on the problems shown during the lectures.

Textbook(s)

D. L. Minh: Applied Probability Models, Duxbury, 2001.

Web site

<http://www.math.is.tohoku.ac.jp/~obata>

Office hours

Please send me an e-mail.

Other information

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