Proof-Based Math Readings
Session: Measure Theoretic Probability
2024 Fall

Zeki Akyol*
Department of Economics
Istanbul Technical University
Click here for the most recent versions of the syllabuses

Version: 02 May 2024, 09:31 PM

Table of contents

0 Motivation **2**

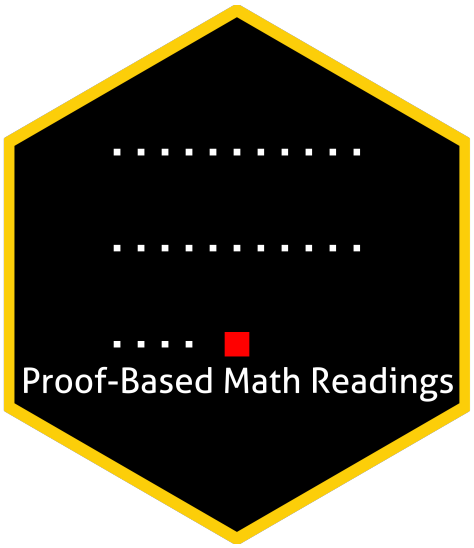
1 Prerequisites **2**

2 Format **2**

3 Resources **2**
3.1 Main Book and Main Book's Playlist . . . 2
3.2 Supplementary . . . 2
3.2.1 Proof . . . 2
3.2.2 Real Analysis . . . 2
3.2.3 Measure Theoretic Probability . . . 2

4 Reading Schedule **3**

5 Further Readings (Optional) **3**



*zekiakyol.com

0 Motivation

- *Proof-Based Math Readings* is a free and independent online reading group where we study mathematics required in economics master's/PhD programs using an intuitive approach.
- This session of the reading group is on *Measure Theoretic Probability*.

1 Prerequisites

- CGPA: 3.00/4.00.
- Proof and Real Analysis resources below are the prerequisites for this session.
- Please use the Application Form to join our reading group anytime.
- Applicants are informed about their application results within a week via email.

2 Format

- This session takes 12 weeks.
- We discuss the topics/exercises that we struggle with at Proof-Based Math Readings [Discord].
- We do not have face-to-face/online meetings due to the size of the group.
- Members are expected to read the chapters, and watch the chapter videos from the book's playlist.

3 Resources

3.1 Main Book and Main Book's Playlist

A First Look at Rigorous Probability Theory - Jeffrey S. Rosenthal (2nd Edition, 2006) is our main book for this session because it is well-written and well-structured.

Jem Corcoran's playlist is our main playlist because her narrative is just great.

- A First Look at Rigorous Probability Theory - Jeffrey S. Rosenthal (2nd Edition, 2006)
- A First Look at Rigorous Probability Theory - Jeffrey S. Rosenthal (2nd Edition, 2006, Errata)
- A First Look at Rigorous Probability Theory - Jeffrey S. Rosenthal (2nd Edition, 2006, Solutions)
- Measure Theoretic Probability - Jem Corcoran (Companion playlist, 2024)

3.2 Supplementary

3.2.1 Proof

- Book of Proof - Richard Hammack (3.3 Edition, 2022)
- Book of Proof - Richard Hammack (3.3 Edition, 2022, Companion playlist by Jeremy Teitelbaum)
- Book of Proof - Richard Hammack (3.3 Edition, 2022, Companion playlist by Michael Penn)

3.2.2 Real Analysis

- Basic Analysis I: Introduction to Real Analysis [Volume I] - Jiri Lebl (Version 6.0, 2023)
- Real Analysis - Casey Rodriguez (2020, Companion playlist to Basic Analysis I)
- Introduction To Metric Spaces - Paige Bright (2023)

3.2.3 Measure Theoretic Probability

- Probability: Theory and Examples - Rick Durrett (5th Edition, 2019)
- Probability: Theory and Examples - Rick Durrett (5th Edition, 2019, Solutions by Hoil Lee, Wonjun Seo)
- Probability: Theory and Examples - Rick Durrett (5th Edition, 2019, Solutions by Luke Andrejek)
- Measure Theoretic Probability-I - Supriyo Bhar (2021)
- Probability Foundations - Krishna Jagannathan (2020)

4 Reading Schedule

RPT is the abbreviation of **A First Look at Rigorous Probability Theory - Jeffrey S. Rosenthal (2nd Edition, 2006)**.

RPT **Week 01-02**

Appendix A: Mathematical Background
Chapter 1: The need for measure theory
Chapter 2: Probability triples

RPT **Week 03-04**

Chapter 3: Further probabilistic foundations
Chapter 4: Expected values

RPT **Week 05-06**

Chapter 5: Inequality and convergence
Chapter 6: Distributions of random variables

RPT **Week 07-08**

Chapter 9: More probability theorems
Chapter 10: Weak convergence

RPT **Week 09-10**

Chapter 11: Characteristic functions

RPT **Week 11-12**

Chapter 12: Decomposition of probability laws
Chapter 13: Conditional probability and expectation

5 Further Readings (Optional)

You can check out our Measure Theory syllabus at github.com/zekiakyol/proof-based-math-readings