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

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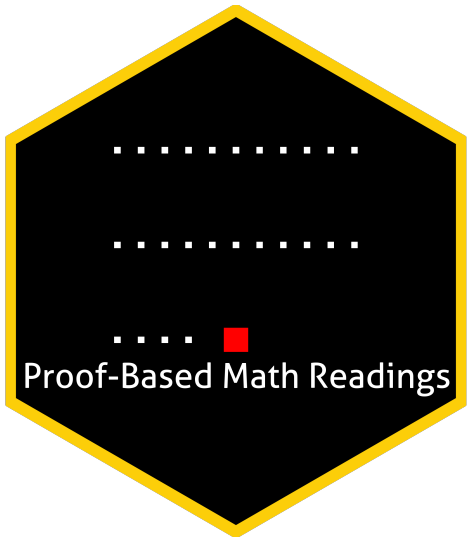

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0 Motivation

- *Proof-Based Math Readings* is a free, independent online reading group where we study the mathematics required for economics master's and PhD programs through an intuitive approach. Active since May 2023.
- This session of the reading group is on *Measure Theoretic Probability*.

1 Prerequisites

- Proof Techniques and Real Analysis resources below.
- Please use the Application Form to join our reading group; you will receive a response within a week.

2 Format

- This session takes 12 weeks. We do not have face-to-face/online meetings due to the size of the group.
- Members read the main book and discuss the topics/exercises in the Proof-Based Math Readings Discord .

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 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)
- A First Look at Rigorous Probability Theory - Jeffrey S. Rosenthal (2nd Edition, 2006, Playlist by J. Corcoran)

3.2 Supplementary

3.2.1 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)

3.2.2 Proof Techniques

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

3.2.3 Real Analysis

- Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.1, 2024)
- Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.1, 2024, Playlist by Casey Rodriguez)
- Introduction To Metric Spaces - Paige Bright (2023)

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)

Our Measure Theory syllabus at github.com/zekiakyol/proof-based-math-readings