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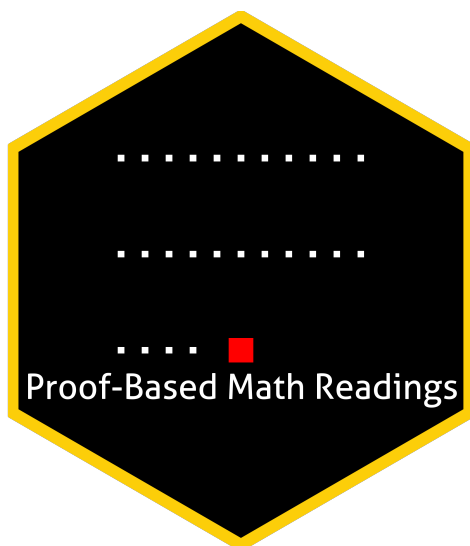# Session: Measure Theoretic Probability
2024 Fall

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Click here for the most recent versions of the syllabuses

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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 his 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** 📅

    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