

# Proof-Based Math Readings

## Session: Measure Theoretic Probability

### 2024 Fall

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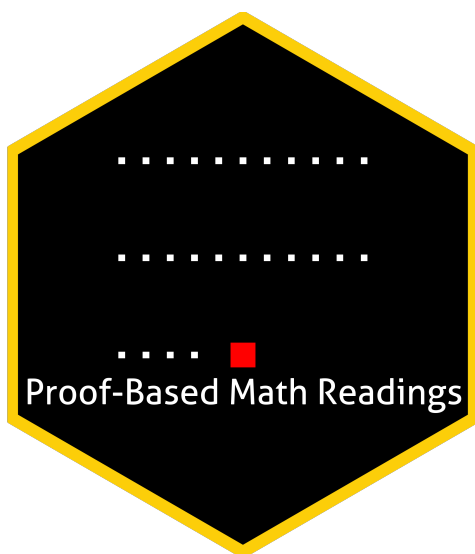
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## 0 Motivation

- *Proof-Based Math Readings* is a free 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.
- 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)
- ▶ A First Look at Rigorous Probability Theory - Jeffrey S. Rosenthal (2nd Edition, 2006, Playlist by Jem Corcoran)

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

#### 3.2.2 Real Analysis













- 📖 Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.0, 2023)
- ▶ Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.0, 2023, Playlist by Casey Rodriguez)
- ▶ 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](https://github.com/zekiakyol/proof-based-math-readings)