

Proof-Based Math Readings

Session: Measure Theoretic Probability

2024 Fall

Zeki Akyol*

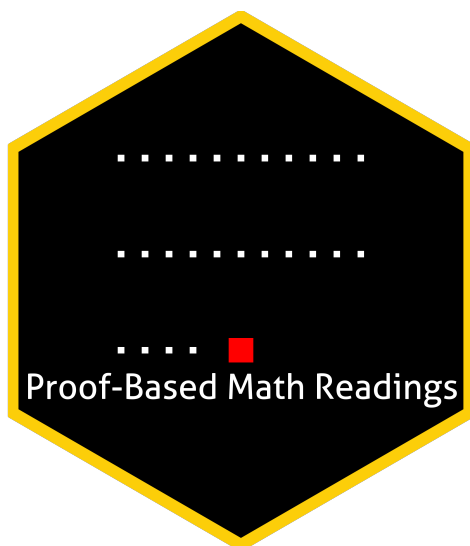
Department of Economics
Istanbul Technical University

[Click here for the most recent versions of the syllabuses](#)

Version: 27 April 2024, 12:12 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




*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 


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