Proof-Based Math Readings
Session: Topology*

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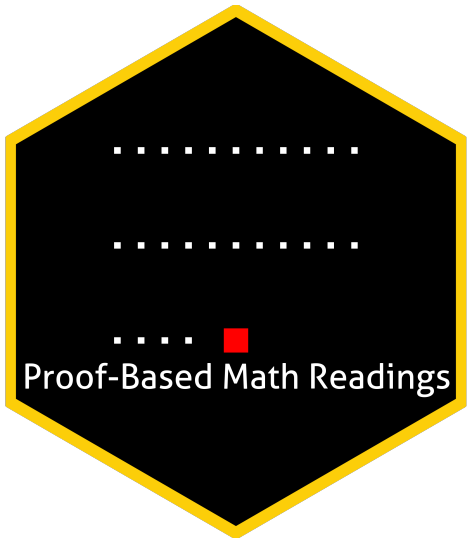

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0 Motivation

- *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 *Topology*.

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

Topology - James Munkres (2nd Edition, 2014) is our main book for this session because it is well-written, well-structured, and has plenty of intuitive figures.

- Topology - James Munkres (2nd Edition, 2014)
- Topology - James Munkres (2nd Edition, 2014, Playlist by Bruno Zimmermann, Video 1-15)
- Topology - James Munkres (2nd Edition, 2014, Solutions for Chapter 1-2 by Dan Whitman)
- Topology - James Munkres (2nd Edition, 2014, Solutions for Chapter 1-2 by solverer)
- Topology - James Munkres (2nd Edition, 2014, Solutions for Chapter 2-3 by positron0802)
- Topology - James Munkres (2nd Edition, 2014, Solutions for Chapter 1-2-3-4 by dbFin)

3.2 Supplementary

3.2.1 Topology

- Schaum's Outline of General Topology - Seymour Lipschutz (2011) → Beginner friendly and contains solutions
- Topology Without Tears - Sidney A. Morris (2024) → Beginner friendly and open-access
- General Topology - Bernard Badzioch (2020)
- Intuitive Topology - Troy Kling (2021)
- Topology - Marius Furter (2022)
- Topology - Michael Penn (2025)

3.2.2 Proof Techniques

- Book of Proof - Richard Hammack (3.4 Edition, 2025)
- Book of Proof - Richard Hammack (3.4 Edition, 2025, Playlist by Jeremy Teitelbaum)

3.2.3 Real Analysis

- Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.2, 2025)
- Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.2, 2025, Playlist by Casey Rodriguez)
- Introduction To Metric Spaces - Paige Bright (2023)

4 Reading Schedule

TM is the abbreviation of **Topology - James Munkres (2nd Edition, 2014)**.

TM, Chapter 1: Set Theory and Logic **Week 01**

1 Fundamental Concepts
2 Functions
3 Relations
4 The Integers and the Real Numbers
5 Cartesian Products
6 Finite Sets
7 Countable and Uncountable Sets
8 The Principle of Recursive Definition
9 Infinite Sets and the Axiom of Choice
10 Well-Ordered Sets
11 The Maximum Principle

TM, Chapter 2: Topological Spaces and Continuous Functions Week 02-03-04-05-06-07

12 Topological Spaces
13 Basis for a Topology
14 The Order Topology
15 The Product Topology on $X \times Y$
16 The Subspace Topology
17 Closed Sets and Limit Points
18 Continuous Functions
19 The Product Topology
20 The Metric Topology
21 The Metric Topology (continued)

TM, Chapter 3: Connectedness and Compactness **Week 08-09-10-11-12**

23 Connected Spaces
24 Connected Subspaces of the Real Line
25 Components and Local Connectedness
26 Compact Spaces
27 Compact Subspaces of the Real Line
28 Limit Point Compactness
29 Local Compactness

5 Further Readings (Optional)

Our Measure Theory and Measure Theoretic Probability syllabuses at github.com/zekiakyol/proof-based-math-readings