

Proof-Based Math Readings

Session: Real Analysis*

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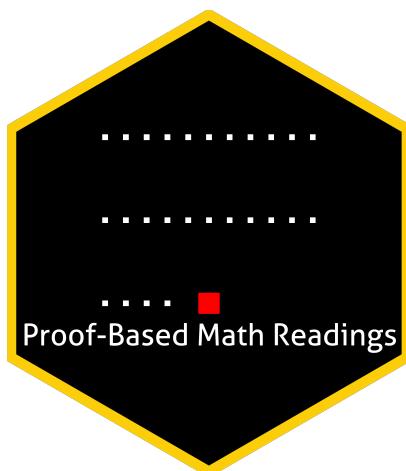
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0 Motivation

- *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 *Real Analysis*.

1 Prerequisites and Format

- Proof Techniques resources below.
- Please use the  [Application Form](#) to join our reading group; you will receive a response within a week.
- 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 .

2 Resources [All are open-access]

2.1 Main Book and Main Book's Playlist

Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.2, 2025) is our main book for this session because it is well-written, well-structured, and open-access.

Casey Rodriguez's playlist is our main playlist because his narrative is great.

-  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)
-  Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.2, 2025, Notes by Casey Rodriguez)

2.2 Supplementary

2.2.1 Real Analysis

-  Real Analysis - Wrath of Math (2025) → Start with this playlist if you find the main book challenging
-  Real Analysis - Michael Penn (2021)
-  Understanding Analysis - Stephen Abbott (2nd Edition, 2016, Playlist by Marc Renault)
-  Understanding Analysis - Stephen Abbott (2nd Edition, 2016, Solutions by Ulisse Mini, Jesse Liby)

2.2.2 Calculus

-  Essence of Calculus - 3Blue1Brown (2023)
-   Single Variable Calculus - David Jerison (2006) and Multivariable Calculus - Denis Auroux (2007)
-  Sequences and Series Calculator - Geogebra
-  Function Graph - Geogebra

2.2.3 Proof Techniques

-  Book of Proof - Richard Hammack (3.4 Edition, 2025)
-  Book of Proof - Richard Hammack (3.4 Edition, 2025, Playlist by Jeremy Teitelbaum, Chapters 1-12)
-  Book of Proof - Richard Hammack (3.4 Edition, 2025, Playlist by Michael Penn, Chapters 1-14)

3 Reading Schedule

- BAI is the abbreviation of Basic Analysis I: Introduction to Real Analysis - Jiri Lebl (Version 6.2, 2025).

BAI, Chapter 0: Introduction	Week 01
List of Notation (Page 309-312) 0.1 About this book 0.2 About analysis 0.3 Basic set theory	
BAI, Chapter 1: Real Numbers	Week 02
1.1 Basic properties 1.2 The set of real numbers 1.3 Absolute value and bounded functions 1.4 Intervals and the size of \mathbb{R}	
BAI, Chapter 2: Sequence and Series	Week 03-04-05
2.1 Sequences and limits 2.2 Facts about limits of sequences 2.3 Limit superior, limit inferior, and Bolzano-Weierstrass 2.4 Cauchy sequences 2.5 Series	
BAI, Chapter 3: Continuous Functions	Week 06-07-08
3.1 Limits of functions 3.2 Continuous functions 3.3 Extreme and intermediate value theorems 3.4 Uniform continuity	
BAI, Chapter 4: The Derivative	Week 09-10
4.1 The derivative 4.2 Mean value theorem 4.3 Taylor's theorem	
BAI, Chapter 5: The Riemann Integral	Week 11-12
5.1 The Riemann integral 5.2 Properties of the integral 5.3 Fundamental theorem of calculus	

4 Further Readings (Optional)

▶ Introduction To Metric Spaces - Paige Bright (2023)