

Proof-Based Math Readings

Session: Statistics*

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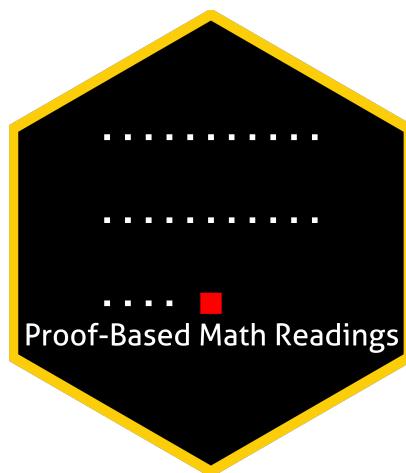
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Version: 18 November 2025, 09:32 PM

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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 *Statistics*.

1 Prerequisites and Format

- Introduction to Probability - Dimitri Bertsekas, John Tsitsiklis (2nd Edition, 2008, Summary Material)
- Introduction to Probability - Dimitri Bertsekas, John Tsitsiklis (2nd Edition, 2008, Playlist)
- Introduction to Probability - Dimitri Bertsekas, John Tsitsiklis (2nd Edition, 2008, Solutions & Errata)
- 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

2.1 Main Book and Main Book's Playlist

Statistical Inference - George Casella, Roger Berger (2nd Edition, 2001 or 2024) is our main book because it is well-written and well-structured.

- ❑ Statistical Inference - George Casella, Roger Berger (2nd Edition, 2001 or 2024)
- ❑ Statistical Inference - George Casella, Roger Berger (2nd Edition, 2001, Errata)
- ❑ Statistical Inference - George Casella, Roger Berger (2nd Edition, 2001 or 2024, Solutions)
- ▶ Statistical Inference - George Casella, Roger Berger (2nd Edition, 2001 or 2024, Playlist for Chapter 1-5 by Stephen Carden)
- ▶ Statistical Inference - George Casella, Roger Berger (2nd Edition, 2001 or 2024, Playlist for Chapter 5-9 by Somesh Kumar)

2.2 Supplementary

2.2.1 Probability and Statistics

- ❑ Introduction to Probability - Joseph K. Blitzstein, Jessiza Hwang (2nd Edition, 2019)
- ❑ Introduction to Probability - Joseph K. Blitzstein, Jessiza Hwang (2nd Edition, 2019, Selected Solutions)
- ▶ Introduction to Probability - Joseph K. Blitzstein, Jessiza Hwang (2nd Edition, 2019, Playlist)
- ▶ Introduction to Mathematical Statistics - Jingyi Jessica Li (2022)
- ▶ Mathematical Statistics - Jem N. Corcoran (2024)
- ❑ The Book of Statistical Proofs - Joram Soch (2024)
- ▶ Statistical Ideas that Changed the World - Robert Tibshirani (2024, Interview Series)
- ❑ The Epic Story of Maximum Likelihood Stephen - M. Stigler (2008)

2.2.2 Proof Techniques

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

3 Reading Schedule

SI is the abbreviation of Statistical Inference - George Casella, Roger Berger (2nd Edition, 2001 or 2024).

SI, Chapter 1: Probability Theory	Week 01
1.1 Set Theory, 1.2 Probability Theory, 1.3 Conditional Probability and Independence, 1.4 Random Variables, 1.5 Distribution Functions, 1.6 Density and Mass Functions	
SI, Chapter 2: Transformations and Expectations	Week 02
2.1 Distributions of a Random Variable 2.2 Expected Values 2.3 Moments and Moment Generating Functions	
SI, Chapter 3: Common Families of Distributions	Week 03-04
3.1 Introduction 3.2 Discrete Distributions 3.3 Continuous Distributions 3.4 Exponential Families 3.5 Location and Scale Families 3.6 Inequality and Identities	
SI, Chapter 4: Multiple Random Variables	Week 05-06
4.1 Joint and Marginal Distributions 4.2 Conditional Distributions and Independence 4.3 Bivariate Transformations 4.4 Hierarchical Models and Mixture Distributions 4.5 Covariance and Correlation 4.6 Multivariate Distributions 4.7 Inequalities	
SI, Chapter 5: Properties of a Random Sample	Week 07-08
5.1 Basic Concepts of Random Samples 5.2 Sums of Random Variables from a Random Sample 5.3 Sampling from the Normal Distribution 5.4 Order Statistics 5.5 Convergence Concepts 5.6 Generating a Random Sample	
SI, Chapter 7: Point Estimation	Week 09-10
7.1 Introduction 7.2 Methods of Finding Estimators 7.3 Methods of Evaluating Estimators	
SI, Chapter 8: Hypothesis Testing	Week 11-12
8.1 Introduction 8.2 Methods of Finding Tests 8.3 Methods of Evaluating Tests	