

# Proof-Based Math Readings

## Session: Statistics\*

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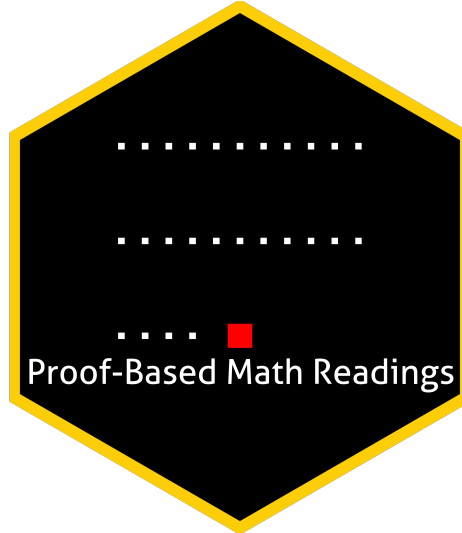
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\*[zekiakyol.com](http://zekiakyol.com)


## 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

- [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.

## 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

**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 \(2nd Edition, 2001 or 2024, Playlist for Chapter 5-9 by Somesh Kumar\)](#)

### 3.2 Supplementary

#### 3.2.1 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 \(2008\)](#)

#### 3.2.2 Proof Techniques

- 📖 [Book of Proof - Richard Hammack \(3.4 Edition, 2025\)](#)
- 🎥 [Book of Proof - Richard Hammack \(3.4 Edition, 2025, Playlist by Jeremy Teitelbaum\)](#)
- 🎥 [Book of Proof - Richard Hammack \(3.4 Edition, 2025, Playlist by Michael Penn\)](#)

## 4 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