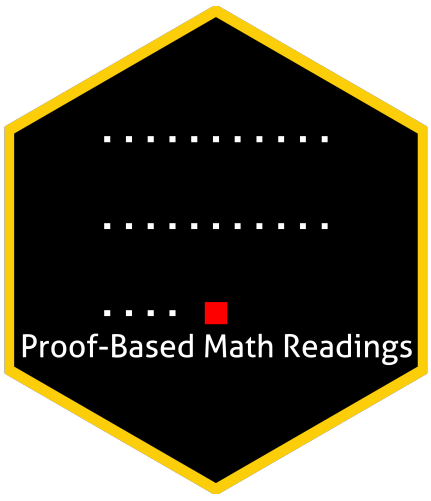
Proof-Based Math Readings
Session: Bayesian Statistics*

Zeki Akyol
Department of Economics
University of California, Santa Cruz
Click here for the most recent version

Version: 01 February 2026, 11:45 AM

Table of contents



*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 *Bayesian Statistics*.

1 Prerequisites and Format

- Proof Techniques and Statistics 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

2.1 Main Book and Main Book's Playlist

Bayesian Econometrics - Gary Koop (2003) is our main book for this session because it is well-written and well-structured.

Gary Koop's playlist is our main playlist because his narrative is great.

- Bayesian Econometrics - Gary Koop (2003)
- Bayesian Econometrics - Gary Koop (2003, Errata)
- Bayesian Econometrics - Gary Koop (2003, Playlist)

2.2 Supplementary

2.2.1 Bayesian Statistics

- Bayes Rules! - Alicia A. Johnson, Miles Q. Ott, Mine Dogucu (2021)
- Bayesian Statistics: A Comprehensive Course - Ben Lambert (2014)
- A Student's Guide to Bayesian Statistics - Ben Lambert (2020)
- Bayesian Data Analysis - A. Gelman, J. Carlin, H. Stern, D. Dunson, A. Vehtari, D. Rubin (3rd Ed., 2025)
- Bayesian Data Analysis - A. Gelman, J. Carlin, H. Stern, D. Dunson, A. Vehtari, D. Rubin (3rd Ed., 2025, Playlist)
- Explaining the Gibbs Sampler - George Casella, Edward I. George (1992)
- Understanding the Metropolis-Hastings Algorithm - Siddhartha Chib, Edward Greenberg (1995)

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)

2.2.3 Statistics

- 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)

3 Reading Schedule

- **BE** is the abbreviation of **Bayesian Econometrics - Gary Koop (2003)**.

BE **Week 01**

Appendix A Introduction to Matrix Algebra

Appendix B Introduction to Probability and Statistics

1 An Overview of Bayesian Econometrics

BE **Week 02**

2 The Normal Linear Regression Model with Natural Conjugate Prior and a Single Explanatory Variable

BE **Week 03-04**

3 The Normal Linear Regression Model with Natural Conjugate Prior and Many Explanatory Variables

BE **Week 05-06**

4 The Normal Linear Regression Model with Other Priors

BE **Week 07-08**

5 The Nonlinear Regression Model

BE **Week 09-10**

6 The Linear Regression Model with General Error Covariance Matrix

BE **Week 11-12**

7 The Linear Regression Model with Panel Data

4 Further Readings (Optional)

- Bayesian Econometric Methods - Joshua Chan, Gary Koop, Dale Poirier, Justin Tobias (2nd Edition, 2019)
- Bayesian Econometric Methods - Joshua Chan, Gary Koop, Dale Poirier, Justin Tobias (2nd Edition, 2019, Errata)