Proof-Based Math Readings Session: Bayesian Statistics[*]
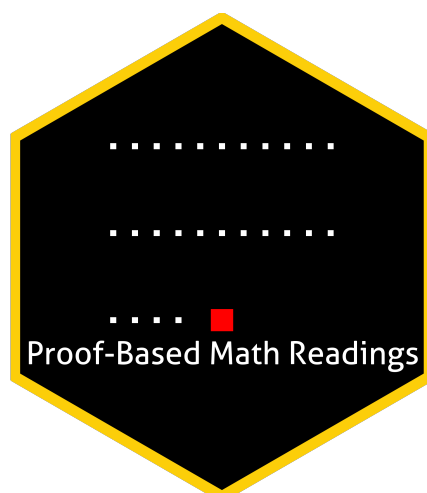
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Proof-Based Math Readings

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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 *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

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📕 **BE**   **Week 03-04** 📅

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

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📕 **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

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📕 **BE**   **Week 11-12** 📅

7 The Linear Regression Model with Panel Data

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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)