Proof-Based Math Readings Session: Matrix Algebra

2023 Fall

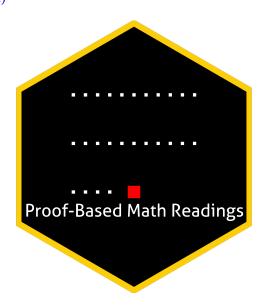
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0 Motivation

- Proof-Based Math Readings is a free and independent online reading group where we study mathematics required in economics master's/PhD programs using an intuitive approach.
- This session of the reading group is on Matrix Algebra.

1 Prerequisites

- CGPA: 3.00/4.00
- Book of Proof Richard Hammack (3.3 Edition, 2022)
- Linear Algebra Gilbert Strang (2005)
- Please use our **O** Application Form to join our reading group anytime.
- Applicants will be informed about their application results within a week via email.

2 Format

- This session will last 12 weeks.
- We will discuss the topics/exercises that we struggle with at Proof-Based Math Readings [Discord].
- We will not have face-to-face/online meetings due to the size of the group.
- Members are expected to read the chapters from the main book.

3 Resources

3.1 Main Book

Matrix Algebra - Karim M. Abadir, Jan R. Magnus (2005) is our main book because it is well-structured and well-written.

- Adadir, Jan R. Magnus (2005)
- Matrix Algebra Karim M. Abadir, Jan R. Magnus (2005, Errata)

3.2 Supplementary

3.2.1 Matrix Algebra

- Matrix Differential Calculus with Applications in Statistics and Econometrics Jan R. Magnus, Heinz Neudecker (3rd Edition, 2019)
- Econometric Theory William H. Greene (Appendix A, 8th Edition, 2020)

3.2.2 **Proof**

- Book of Proof Richard Hammack (3.3 Edition, 2022)
- Book of Proof Richard Hammack (3.3 Edition, 2022, Companion playlist by Jeremy Teitelbaum)
- Book of Proof Richard Hammack (3.3 Edition, 2022, Companion playlist by Michael Penn)

4 Reading Schedule

• MA is the abbreviation of Matrix Algebra - Karim M. Abadir, Jan R. Magnus (2005).

⊞ Week 01-02

- MA, Appendix A: Some mathematical tools
- **MA**, Appendix B: Notation
- MA, Chapter 1: Vectors
- **MA**, Chapter 2: Matrices
- MA, Chapter 4: Rank, inverse, and determinant

⊞ Week 03-04

- MA, Chapter 5: Partitioned matrices
- MA, Chapter 6: Systems of equations

⊞ Week 05-06

- **MA**, Chapter 7: Eigenvalues, eigenvectors, and factorizations
- MA, Chapter 8: Positive (semi)definite and idempotent matrices

i Week 07-08-09

- MA, Chapter 10: Kronecker product, vec-operator, and Moore-Penrose inverse
- MA, Chapter 11: Patterned matrices: commutation- and duplication matrix

Week 10-11-12

- MA, Chapter 12: Matrix inequalities
- MA, Chapter 13: Matrix calculus
- MA, Chapter 3: Vector spaces (Optional)

5 Further Readings (Optional)

You can check out our Linear Algebra syllabus at O github.com/zekiakyol/proof-based-math-readings