

# Proof-Based Math Readings

## Session: Matrix Algebra\*

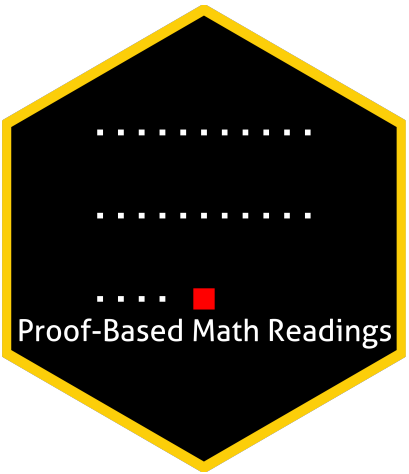
**Zeki Akyol**

Department of Economics  
University of California, Santa Cruz  
[Click here for the most recent version](#)

Version: 07 December 2025, 12:26 AM

### Table of contents

<b>0</b>	<b>Motivation</b>	<b>2</b>
<b>1</b>	<b>Prerequisites and Format</b>	<b>2</b>
<b>2</b>	<b>Resources</b>	<b>2</b>
2.1	Main Book . . . . .	2
2.2	Supplementary . . . . .	2
2.2.1	Matrix Algebra . . . . .	2
2.2.2	Proof Techniques . . . . .	2
<b>3</b>	<b>Reading Schedule</b>	<b>3</b>
<b>4</b>	<b>Further Readings (Optional)</b>	<b>3</b>






---

\*[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 *Matrix Algebra*.

## 1 Prerequisites and Format

- Proof Techniques resources below and  [Linear Algebra - Gilbert Strang \(2005\)](#).
- 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

**Matrix Algebra - Karim M. Abadir, Jan R. Magnus (2005)** is our main book because it is well-written and well-structured. It also provides detailed solutions for the exercises.




-  [Matrix Algebra - Karim M. Abadir, Jan R. Magnus \(2005\)](#)
-  [Matrix Algebra - Karim M. Abadir, Jan R. Magnus \(2005, Errata\)](#)

### 2.2 Supplementary

#### 2.2.1 Matrix Algebra













-  [A Gentle Introduction to Matrix Calculus - Jan R. Magnus \(2024\)](#)
-  [The Matrix Cookbook - Kaare Brandt Petersen, Michael Syskind Pedersen \(2012\)](#)
-  [Econometric Theory - William H. Greene \(Appendix A, 8th Edition, 2020\)](#)
-  [matrixcalculus.org](https://matrixcalculus.org)

#### 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

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

 <b>MA</b>	<b>Week 01</b> 
Appendix A: Some mathematical tools Appendix B: Notation Chapter 1: Vectors Chapter 2: Matrices	
 <b>MA</b>	<b>Week 02</b> 
Chapter 3: Vector spaces Chapter 4: Rank, inverse, and determinant	
 <b>MA</b>	<b>Week 03-04</b> 
Chapter 5: Partitioned matrices Chapter 6: Systems of equations	
 <b>MA</b>	<b>Week 05-06</b> 
Chapter 7: Eigenvalues, eigenvectors, and factorizations Chapter 8: Positive (semi)definite and idempotent matrices Chapter 9: Matrix functions	
 <b>MA</b>	<b>Week 07-08-09</b> 
Chapter 10: Kronecker product, vec-operator, and Moore-Penrose inverse Chapter 11: Patterned matrices: commutation- and duplication matrix	
 <b>MA</b>	<b>Week 10-11-12</b> 
Chapter 12: Matrix inequalities Chapter 13: Matrix calculus	

### 4 Further Readings (Optional)

-  Matrix Differential Calculus with Applications in Statistics and Econometrics - Jan R. Magnus, Heinz Neudecker (3rd Edition, 2019)