

# Applied Linear Algebra



## 1 Matrices and Gaussian Elimination

1.2 The Geometry of Linear Equations	3
1.3 Gaussian Elimination	4
1.4 Matrix Notation and Matrix Multiplication	5
1.5 Triangular Factors and Row Exchanges	6
1.6 Inverses and Transposes	7
1.7 Special Matrices and Applications	8
Chapter 1 Review Exercises	9

## 2 Vector Spaces

2.1 Vector Spaces and Subspaces	10
2.2 Solving $Ax = 0$ and $Ax = b$	11
2.3 Linear Independence, Basis, and Dimension	12
2.4 The Four Fundamental Subspaces	13
2.5 Graphs and Networks	14
2.6 Linear Transformations	15
Chapter 2 Review Exercises	16

## 3 Orthogonality

3.1 Orthogonal Vectors and Subspaces	17
3.2 Cosines and Projections onto Lines	18
3.3 Projections and Least Squares	19
3.4 Orthogonal Bases and Gram-Schmidt	20
3.5 The Fast Fourier Transform	21
Chapter 3 Review Exercises	22

## 4 Determinants

4.2 Properties of the Determinant	23
4.3 Formulas for the Determinant	24
4.4 Applications of Determinants	25
Chapter 4 Review Exercises	26

## 5 Eigenvalues and Eigenvectors

5.2 Diagonalization of a Matrix	27
5.3 Difference Equations and Powers	28

5.4 Differential Equations	29
5.5 Complex Matrices	30
5.6 Similarity Transformations	31
Chapter 5 Review Exercises	32
<b>6 Positive Definite Matrices</b>	
6.1 Minima, Maxima, and Saddle Points	33
6.2 Tests for Positive Definiteness	34
6.3 Singular Value Decomposition	35
6.4 Minimum Principles	36
6.5 The Finite Element Method	37
<b>7 Computations with Matrices</b>	
7.2 Matrix Norm and Condition Number	38
7.3 Computation of Eigenvalues	39
7.4 Iterative Methods for $Ax = b$	40
<b>8 Linear Programming and Game Theory</b>	
8.1 Linear Inequalities	41
8.2 The Simplex Method	42
8.3 The Dual Problem	43
8.4 Network Models	44
8.5 Game Theory	45

# 1 Matrices and Gaussian Elimination



## 1.2 The Geometry of Linear Equations

## 1.3 Gaussian Elimination

## 1.4 Matrix Notation and Matrix Multiplication

## 1.5 Triangular Factors and Row Exchanges

## 1.6 Inverses and Transposes

## 1.7 Special Matrices and Applications



# Chapter 1 Review Exercises

## 2 Vector Spaces



### 2.1 Vector Spaces and Subspaces

## 2.2 Solving $Ax = 0$ and $Ax = b$

## 2.3 Linear Independence, Basis, and Dimension

## 2.4 The Four Fundamental Subspaces

## 2.5 Graphs and Networks

## 2.6 Linear Transformations

# Chapter 2 Review Exercises



## 3 Orthogonality



### 3.1 Orthogonal Vectors and Subspaces

## 3.2 Cosines and Projections onto Lines

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## 4.4 Applications of Determinants

## Chapter 4 Review Exercises

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# Chapter 5 Review Exercises



## 6 Positive Definite Matrices



### 6.1 Minima, Maxima, and Saddle Points

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## 6.5 The Finite Element Method

# 7 Computations with Matrices



## 7.2 Matrix Norm and Condition Number

## 7.3 Computation of Eigenvalues

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# 8 Linear Programming and Game Theory



## 8.1 Linear Inequalities

## 8.2 The Simplex Method

## 8.3 The Dual Problem

## 8.4 Network Models

## 8.5 Game Theory