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Part II

Linear Algebra

Chapter 1

Vectors

1.1 The Geometry and Algebra of Vectors

1.2 Length and Angle: The Dot Product

1.3 Lines and Planes

1.4 Code Vectors and Modular Systems

Chapter 2

Systems of Linear Equations

- 2.1 Introduction to Systems of Linear Equations
- 2.2 Direct Methods for Solving Linear Systems
- 2.3 Spanning Sets and Linear Independence
- 2.4 Applications
- 2.5 Iterative Method for Solving Linear Systems

Chapter 3

Matrices

3.1 Matrix Operations

3.2 Matrix Algebra

3.3 The Inverse of a Matrix

3.4 The LU Factorization

3.5 Subspaces, Basis, Dimension, and Rank

3.6 Introduction to Linear Transformations

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Chapter 4

Eigenvalues and Eigenvectors

- 4.1 Introduction to Eigenvalues and Eigenvectors
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- 4.3 Eigenvalues and Eigenvectors of $n \times n$ Matrices
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Chapter 5

Orthogonality

5.1 Orthogonality in \mathbb{R}^n

5.2 Orthogonal Complements and Orthogonal Projections

5.3 The Gram-Schmidt Process and the QR Factorization

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Chapter 6

Vector Spaces

6.1 Vector Spaces and Subspaces

6.2 Linear Independence, Basis, and Dimension

6.3 Change of Basis

6.4 Linear Transformation

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Chapter 7

Distance and Approximation

7.1 Inner Product Spaces

7.2 Norms and Distance Function

7.3 Least Squares Approximation

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