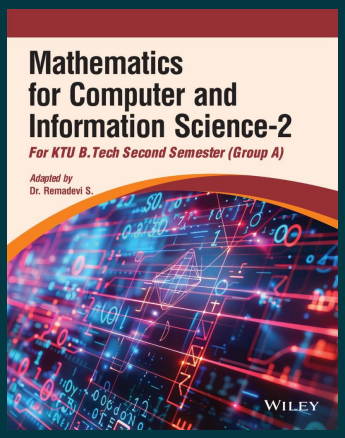
WILEY



Mathematics for Computer and Information Science (Group A) For KTU B.Tech Second Semester

By Dr. Remadevi S.

Paperback 9789363863118 ₹493.00

Pages: 262

Description

Discover the Ultimate Guide to Calculus and Linear Algebra

This book is a carefully crafted adaptation of three best-selling classics: Advanced Engineering Mathematics by Erwin Kreyszig, Calculus: Early Transcendentals, 12th Edition by Howard Anton, and Elementary Linear Algebra: Applications Version, 12th Edition by Howard Anton, Chris Rorres, and Anton Kaul.

Renowned for its clear explanations and engaging teaching style, this text provides a foundational understanding of calculus and linear algebra tailored to meet the needs of modern learners. Designed with a strong focus on pedagogy, it simplifies complex concepts, making them accessible to students at every level.

Key Topics Covered:

- Systems of Linear Equations and Matrices
- General Vector Spaces
- Inner Product Spaces
- Linear Transformations

Whether you’re a student aiming to master the basics or an instructor seeking a reliable resource, this book delivers an unparalleled learning experience.

About the Author

Dr. Remadevi S.

Adapted for KTU by

Dr. Remadevi. S

Retd. Professor and Head of Department of Applied Science,

Govt. Model Engineering College,

Thrikkakara, Cochin, Kerala

Table of Contents

1. SYSTEM OF LINEAR EQUATIONS AND MATRICES

1.1 Linear Systems of Equations Gauss Elimination

Linear System, Coefficient Matrix, Augmented Matrix

Gauss Elimination and Back Substitution

Elementary Row Operations. Row-equivalent Systems
Gauss Elimination: The Three Possible Cases of Systems
Row Echelon Form and Information from It
Quick Check Problem 1.1
Problem Set 1.1
Answer Key
1.2 Linear Independence. Rank of a Matrix. Vector Space
Linear Independence and Dependence of Vectors
Rank of a Matrix
Vector Space
Quick Check Problem 1.2
Problem Set 1.2
Answer Key
1.3 Solutions of Linear Systems: Existence, Uniqueness
Homogeneous Linear System
Nonhomogeneous Linear Systems
Problem Set 1.3
Answer Key
1.4 The Matrix Eigenvalue Problem. Determining Eigenvalues and Eigenvectors
How to Find Eigenvalues and Eigenvectors
Quick Check Problem 1.4
Problem Set 1.4
Answer Key
1.5 Eigenbases. Diagonalization. Quadratic Forms
Similarity of Matrices. Diagonalization
Quick Check Problem 1.5
Problem Set 1.5
Answer Key
2. GENERAL VECTOR SPACES
2.1 Real Vector Spaces
Solved Examples
Counter examples
A Closing Observation
Problem Set 2.1
Answer Key
2.2 Subspaces
The Hierarchy of Function Spaces
Building Subspaces

Solution Spaces of Homogeneous Systems
The Linear Transformation Viewpoint
Solved Examples
Problem Set 2.2
Answer Key
2.3 Spanning set and Linear Independence
A Concluding Observation
Solved Examples
Linear Independence and Dependence
Test for Linear Independence and Linear Dependence
Solved Examples
Problem Set 2.3
Answer Key
2.4 Coordinates, Basis and Dimension
Coordinate Systems in Linear Algebra
Basis for a Vector Space
Coordinates Relative to a Basis
Dimension
Solved Examples
Problem Set 2.4
Answer Key
2.5 Change of Basis and Transition Matrix
Coordinate Maps
Change of Basis
Transition Matrices
Transforming Coordinates
Invertibility of Transition Matrices
An Efficient Method for Computing Transition Matrices between Bases for Rn
Transition to the Standard Basis for Rn
Solved Examples
Problem Set 2.5
Answer Key
3. INNER PRODUCT SPACES
3.1 Vector Length, norm, and Dot Product in Rn
Norm of a Vector
Unit Vectors
The Standard Unit Vectors

Distance in Rn
Dot Product
Component Form of the Dot Product
Algebraic Properties of the Dot Product
Cauchy–Schwarz Inequality and Angles in Rn
Geometry in Rn
Dot Products as Matrix Multiplication
A Dot Product View of Matrix Multiplication
Orthogonal Vectors
Lines and Planes Determined by Points and Normals
Orthogonal Projections
Reflections About Lines Through the Origin
Norm of a Projection
The Theorem of Pythagoras
Distance Problems
Solved Examples
Problem Set 3.1
Answer Key
3.2 Inner Product Spaces
General Inner Products
An Application of Weighted Euclidean Inner Products
Unit Circles and Spheres in Inner Product Spaces
Inner Products Generated by Matrices
Other Examples of Inner Products
Algebraic Properties of Inner Products
Angle and Orthogonality in Inner Product Spaces
Angle Between Vectors
Properties of Length and Distance in General Inner Product Spaces
Orthogonality
Orthogonal Complements
Orthogonal Projections
Solved Examples
Problem Set 3.2
Answer Key
3.3 Orthonormal Bases: Gram-Schmidt Process
Orthogonal and Orthonormal Sets
Coordinates Relative to Orthonormal Bases
Orthogonal Projections

A Geometric Interpretation of Orthogonal Projections
The Gram–Schmidt Process
Extending Orthonormal Sets to Orthonormal Bases
Solved Problems
Problem Set 3.3
Answer Key
3.4 Orthogonal Subspaces and Least Squares Problem
Orthogonal Vectors
Orthogonal Subspaces
Orthogonal Compliment
Solved Examples
Orthogonal Projection
Projection Onto a Subspace of Rn
Solved Example
Least Square Problems
Finding Least Squares Solutions
Conditions for Uniqueness of Least Squares Solutions
More on the Equivalence Theorem
Solved Examples
Problem Set 3.4
Answer Key
4. LINEAR TRANSFORMATIONS
4.1 General Linear Transformations
Definitions and Terminology
Finding Linear Transformations from Images of Basis Vectors
Solved Examples
Rotation in R2
Projection in R3
Solved Examples
Problem Set 4.1
Answer Key
4.2 The Kernel and Range of a Linear Transformation
Kernel and Range
Properties of Kernel and Range
Rank and Nullity of Linear Transformations
Solved Examples
Problem Set 4.2
Answer Key

4.3 Matrices for Linear Transformation

Matrices of Linear Transformations

Matrices of Linear Operators

Matrices of Identity Operators

Matrices of Compositions and Inverse Transformations

Solved Examples

Problem Set 4.3

Answer Key

To purchase this product, please visit:
https://www.wileyindia.com/mathematics-for-computer-and-information-science-group-a-for-ktu-b-tech-second-semester.html

Scan to buy