Introductory Linear Algebra

#introductory linear algebra #linear algebra concepts #vectors and matrices #linear transformations #mathematics fundamentals

Explore the fundamental concepts of linear algebra, perfect for beginners seeking to build a strong mathematical foundation. This comprehensive guide covers essential topics such as vectors, matrices, systems of linear equations, and linear transformations, providing crucial insights for applications in data science, engineering, and computer graphics.

Introductory Linear Algebra

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What is a matrix
Order
Adding
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Matrix Transpose
Addition and Subtraction
Multiplication

The Inverse of a Matrix
Invert the Matrix
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Gauss Jordan elimination
Algorithm
Linear Operations
Example
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Numbers (natural, integer, rational, real, complex)
Associative property of addition and multiplication
Commutative property of addition and multiplication
Cancelling fractions
Multiplying fractions
Subtraction
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Intro
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Column vectors
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Linear Algebra - Vector Equations (1 of 2)
Linear Algebra - Vector Equations (2 of 2)
Linear Algebra - The Matrix Equation Ax = b (1 of 2)
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Linear Algebra - Solution Sets of Linear Systems
Linear Algebra - Linear Independence
Linear Algebra - Linear Transformations (1 of 2)

Linear Algebra - Linear Transformations (2 of 2)
Linear Algebra - Matrix Operations
Linear Algebra - Matrix Inverse
Linear Algebra - Invertible Matrix Properties
Linear Algebra - Determinants (1 of 2)
Linear Algebra - Determinants (2 of 2)
Linear Algebra - Cramer's Rule
Linear Algebra - Vector Spaces and Subspaces (1 of 2)
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Linear Algebra - Null Spaces, Column Spaces, and Linear Transformations
Linear Algebra - Basis of a Vector Space
Linear Algebra - Coordinate Systems in a Vector Space
Linear Algebra - Dimension of a Vector Space
Linear Algebra - Rank of a Matrix
Linear Algebra - Markov Chains
Linear Algebra - Eigenvalues and Eigenvectors
Linear Algebra - Matrix Diagonalization
Linear Algebra - Inner Product, Vector Length, Orthogonality
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Solving Systems of Linear Equation
Using Matrices to solve Linear Equations
Reduced Row Echelon form
Gaussian Elimination
Existence and Uniqueness of Solutions
Linear Equations setup
Matrix Addition and Scalar Multiplication
Matrix Multiplication
Properties of Matrix Multiplication
Interpretation of matrix Multiplication
Introduction to Vectors
Solving Vector Equations
Solving Matrix Equations
Matrix Inverses
Matrix Inverses for 2*2 Matrics
Equivalent Conditions for a Matrix to be INvertible
Properties of Matrix INverses
Transpose
Symmetric and Skew-symmetric Matrices
Trace
The Determent of a Matrix
Determinant and Elementary Row Operations
Determinant Properties
Invertible Matrices and Their Determinants.....
Eigenvalues and Eigenvectors
Properties of Eigenvalues
Diagonalizing Matrices
Dot Product (linear Algebra)
Unit Vectors
Orthogonal Vectors
Orthogonal Matrices
Symmetric Matrices and Eigenvectors and Eigenvalues
Symmetric Matrices and Eigenvectors and Eigenvalues
Diagonalizing Symmetric Matrices
Linearly Independent Vectors
Gram-Schmidt Orthogonalization
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Singular Value Decomposition How to Find It
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Consider the ideal I = (x² + 1,y) in the polynomial ringC[x, y]. Which of the following
Let R = {f: {1, 2, ..., 10} ' Z2} be the set of all 2-valued functions on the set {1, 2, ..., 10) of the first ten positive integers.
Which of the following rings are principal ideal domains (PID)?
Which of the following polynomials are irreducible in Z[x]?
Let R be a subring of containing 1. Then which of the following is necessarily true?
Let z = e ^ ((2pi*i)/7) and let theta = z + z ^ 2 + z ^ 4 Then
Let f(x) Z[x] be a monic polynomial. Then the roots of f
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Introduction
Linear Equations
Simple vs Complex
Basic Definitions
Simple Systems
Consistent Systems
Outro
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An Arbitrary Transformation and a Linear Transformation
Linear Combination
Inverse Transformation
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Introduction to Linear Algebra by Hefferon
One.I.1 Solving Linear Systems, Part One
One.I.1 Solving Linear Systems, Part Two
One.I.2 Describing Solution Sets, Part One
One.I.2 Describing Solution Sets, Part Two
One.I.3 General = Particular + Homogeneous
One.II.1 Vectors in Space
One.II.2 Vector Length and Angle Measure
One.III.1 Gauss-Jordan Elimination
One.III.2 The Linear Combination Lemma
Two.I.1 Vector Spaces, Part One
Two.I.1 Vector Spaces, Part Two
Two.I.2 Subspaces, Part One
Two.I.2 Subspaces, Part Two
Two.II.1 Linear Independence, Part One
Two.II.1 Linear Independence, Part Two
Two.III.1 Basis, Part One
Two.III.1 Basis, Part Two
Two.III.2 Dimension

Two.III.3 Vector Spaces and Linear Systems
Three.I.1 Isomorphism, Part One
Three.I.1 Isomorphism, Part Two
Three.I.2 Dimension Characterizes Isomorphism
Three.II.1 Homomorphism, Part One
Three.II.1 Homomorphism, Part Two
Three.II.2 Range Space and Null Space, Part One
Three.II.2 Range Space and Null Space, Part Two.
Three.II Extra Transformations of the Plane
Three.III.1 Representing Linear Maps, Part One.
Three.III.1 Representing Linear Maps, Part Two
Three.III.2 Any Matrix Represents a Linear Map
Three.IV.1 Sums and Scalar Products of Matrices
Three.IV.2 Matrix Multiplication, Part One
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