MA281: Introduction to Linear Algebra

Baker University — Fall 2023

Course Outline

Unless otherwise noted, each of the following sections comes from the textbook *Linear Algebra* (Third Edition) by John B. Fraleigh and Raymond A. Beauregard.

Exam 1: Vectors and Matrices

- §1.1: Vectors in Euclidean Space
- §1.2: The Norm and the Dot Product
- §1.3: Matrices and Their Algebra
- §1.4: Solving Systems of Linear Equations
- §1.5: Inverses of Square Matrices
- §1.6: Homogeneous Systems, Subspaces, and Bases
- §2.1: Independence and Dimension
- §2.2: The Rank of a Matrix
- §4.1: Areas, Volumes, and Cross Products
- §4.2: The Determinant of a Square Matrix
- §4.3: Computations of Determinants and Cramer's Rule

Exam 2: Eigenvalues, Eigenvectors, and Canonical Forms

- Characteristic and Minimal Polynomials
- §5.1: Eigenvalues and Eigenvectors
- §5.2: Diagonalization
- The Cayley-Hamilton Theorem
- The Smith Normal Form
- The Jordan Canonical Form
- The Rational Canonical Form

Exam 3: Vector Spaces and Linear Transformations

- §2.3: Linear Transformations of Euclidean Spaces

- §3.1: Vector Spaces

- §3.2: Basic Concepts of Vector Spaces

- §3.3: Coordinatization of Vector Spaces

- §7.2: Matrix Representations and Similarity

- §3.4: Linear Transformations

- §3.5: Inner Product Spaces