

Exam 1 Outline

Geometry of \mathbb{R}^2 and \mathbb{R}^3 : Vectors, Lines, Planes, and Matrices

Date: Wednesday, October 8, 2025

- I. Vectors in \mathbb{R}^2 and \mathbb{R}^3
 - A. Basics of Vectors and Applications
 - B. Various Notations for Vectors
 - C. Dot and Cross Products and their Geometric Interpretations
- II. Lines and Planes in \mathbb{R}^3
 - A. Parametric Equations of Lines
 - B. Equations of Planes
 - C. Distance from a Point to a Given Line or Plane
 - D. Intersections of Lines and Planes
- III. Linear Transformations of Vectors
 - A. Solve Systems of Linear Equations with Augmented Matrices
 - B. Matrices as Linear Transformations
 - C. Matrix Operations
 - D. Inverse Matrices and Determinants
 - E. Eigenvalues and Eigenvectors