

First Semester Area B

CSE 383C/CS 383C/M 383E/ME 397, Numerical Analysis: Linear Algebra

1. Review of Linear Algebra

- 1.1. Solution of linear systems and LU decompositions
- 1.2. Orthogonality, projections, and QR decompositions
- 1.3. Eigenvalues and SVD decompositions

2. Direct Numerical Linear Algebra

- 2.1. Stability, conditioning, and convergence: backward error analysis and well-posedness
- 2.2. LU and Cholesky decompositions
- 2.3. QR and SVD decompositions

3. Iterative Methods

- 3.1. Krylov subspace methods
- 3.2. Conjugate gradient method and preconditioning

4. Some Applications

- 4.1. Eigenvalue problems
- 4.2. Banded and sparse matrices
- 4.3. Least square problems using QR and SVD decompositions