

Tentative Course Schedule of Math 170A, Fall 2008

Jiawang Nie

The textbook is *Fundamentals of Matrix Computations* (by David S. Watkins, 2nd edition, Wiley-Interscience, 2002), which is reserved in the Science & Engineering library.

Week 0:

- 9/26: Matrix/vector operations (§1.1)

Week 1:

- 9/29: linear system and triangular system (§1.2, §1.3)
- 10/1: positive definite and semidefinite matrices (§1.4)
- 10/3: Cholesky factorization (§1.4)

Week 2:

- 10/6: vector and matrix norms (§2.1)
- 10/8: condition numbers (§2.2)
- 10/10: perturbation theory of linear equations (§2.3)

Week 3:

- 10/13: floating point arithmetic (§2.5)
- 10/15: round off errors and backward stability (§2.5)
- 10/17: Gaussian elimination (§1.7)

Week 4:

- 10/20: LU factorization (§1.7)
- 10/22: Gaussian elimination with partial pivoting (§1.8)
- 10/24: **Midterm I**

Week 5:

- 10/27: inner products and orthogonal matrices (§3.2)
- 10/29: rotation and reflection matrices (§3.2)
- 10/31: QR factorization (§3.2)

Week 6:

- 11/3: Solution of Least Squares problems (§3.3)
- 11/5: Gram-Schmidt process (§3.4)
- 11/7: Singular Value Decomposition (SVD) (§4.1)

Week 7:

- 11/10: Applications of SVD (§4.2)
- 11/12: SVD and Least Squares Problems (§4.3)
- 11/14: Some basics of eigenvalues (§5.2)

Week 8:

- 11/17: **Midterm II**
- 11/19: The power method (§5.3)
- 11/21: Similarity transformation (§5.4)

Week 9:

- 11/24: Reduction to Hessenberg forms (§5.5)
- 11/26: Reduction to Tridiagonal forms (§5.5)

Week 10: HW #9 will be due!

- 12/1: SVD and Eigenvalues (§5.9)
- 12/3: sensitivity of eigenvalues (§6.5)
- 12/5: sensitivity of eigenvectors (§6.5)