

MATH 7710 Advanced Numerical Linear Algebra

(Spring 2023)

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Office Hours: Tuesday and Thursday 12:00-1:00pm, or by Appointment, or Anytime I am in my office

Text: *Fundamentals of Matrix Computations, Second Edition*, by David S. Watkins

Prerequisites: MATH 4032 or equivalent; MATH 4153 or equivalent; Basic programming abilities in Matlab, Fortran or C

Contents: This is an advanced course in numerical linear algebra. Depending on the time available, tentative topics include Gaussian elimination: LU and Cholesky factorizations; Least squares problem: QR factorization and Householder algorithm, backward stability, singular value decomposition and conditioning; Iterative methods: Jacobi, Gauss-Seidel and conjugate gradient; Eigenproblems: power methods and QR algorithm.

Grade:

- Homeworks: 30%
- Projects: 20%
- Midterm Exams: 20%
- Final Exam: 30%

Programming: The programming projects in this course is done in MATLAB. The Matlab primer can be downloaded from

<https://www.mathworks.com/help/pdf/matlab/getstart.pdf>

The MATLAB *Guide (Second Edition)* by D.J. Higham and N.J. Higham (SIAM, ISBN:0-89871-578-4) is recommended as a reference for Matlab.

Important Note: Except for unforeseen reasons, students must obtain advance approval from the instructor for missing any assignments including Projects and Exams, etc. Under this case, any excuse for missing an assignment must be properly documented and any missed assignment must be made up within three days.