Math 625: Numerical Linear Algebra

Spring 2021: Asynchronous – Meeting Schedule to be determined

Instructor: Dr. Daniel Anderson
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Office Hours: Online: To Be Determined, and by appointment.

Text: *Numerical Linear Algebra*, by L.N. Trefethen and D. Bau, III (SIAM, 1997). **Other References:** *Matrix Computations*, by Gene H. Golub and Charles F. Van Loan (Johns Hopkins, 1996), *Applied Numerical Linear Algebra*, by James W. Demmel (SIAM, 1997), *Linear Algebra and Its Applications*, by Gilbert Strang (Harcourt Brace Jovanovich, 1988), *A Multigrid Tutorial*, William L. Briggs, Van Emden Henson and Steve McCormick (SIAM, 2000) 2nd Edition.

Prerequisites: Sufficient recall of undergraduate linear algebra and computer literacy including familiarity with Matlab.

Course Description: In this course, students will learn numerical methods for solving linear systems of equations, least squares problems, eigenvalue problems and the singular value decomposition. Included here are the development of the algorithms and the examination of their accuracy and stability. Both direct and iterative methods will be discussed. Computational assignments using Matlab and written assignments will be given.

Topics:

Chapter 1	Fundamentals of Linear Algebra
Chapter 2	QR Factorization and Least Squares
Chapter 3	Conditioning and Stability
Chapter 4	Systems of Equations
Chapter 5	Eigenvalue Problems
Chapter 6	Iterative Methods

Grading Policy: A student's course grade will be based on homework (60%), a midterm project (20%) and the final project (20%).

Midterm Project: This will be scheduled for sometime around mid-late March.

Final Project: This will be due at the end of the semester (stay tuned for more details).

Honor Code: It is expected that each student in this class will conduct himself or herself within the guidelines of the Honor Code. All academic work should be done with the level of honesty and integrity that this University demands.