Math 5640/6640 - Introduction to Numerical Analysis II

Spring 2007

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Math 5640/6640 - Introduction to Numerical Analysis II (3). Lec. 3.
Pr., Math 2660, programming ability. Numerical solutions of systems of linear equations, numerical computation of eigenvalues and eigenvectors, error analysis. Written programs using the algorithms.

Text:
A.QUARTERONI, R. SACCO, AND F. SALERI, *Numerical Mathematics*, Second Edition, Springer, New York, 2007.
This text is used for both Math 5630/6630 and Math 5640/6640, which can be taken in any order.)

References:
T. A. DAVIS AND K. SIGMON, *MATLAB Primer*, Seventh Edition, Chapman & Hall/CRC, Boca Raton, 2005.
D. J. HIGHAM AND N. J. HIGHAM, *MATLAB Guide*, Second Edition, SIAM, Philadelphia, 2005..

Coverage: Parts of (Parts I and II) Chapters 1–5 . The topics we will explore are.
Part I: Quick review of matrix analysis. Principles of numerical mathematics and floating point arithmetic.
Part II: Direct methods for approximating solutions of linear systems of algebraic equations $A\mathbf{x} = \mathbf{b}$. Iterative methods for approximating solutions of linear systems of algebraic equations $A\mathbf{x} = \mathbf{b}$. Numerical methods for approximating solutions (eigenvalues and eigenvectors) of matrix eigenvalue problems $A\mathbf{x} = \lambda\mathbf{x}$.

Homework: Homework (problems and computer assignments) will be assigned, graded, and will be counted towards the final grade. For the programs students may use a high level programming language of their choice, though I will encourage the use of Matlab (students will not be allowed to use the high level built-in functions of Matlab, details will be given in class). Computer assignment submission should include a hard copy of the computer program (annotated appropriately) and printout of output of sample runs of the code (electronic submission of program source code may also be required).

Exams: There will be two one-hour exams (28% each) and a final exam (56%). Tests will be announced at least three days in advance. Make up tests will not be given unless a special circumstance exists (consult the Tiger Cub for details). Tentative (one-hour exam) test dates are Th. February 15 and Th. April 19.

Grading: The lowest one-hour exam score or one half of the final exam score will be dropped, the total of these (two or three test) scores will count as 84% of the final grade. Homework grade will count as 16% of the final grade. Different exams will be given, and different homework will be assigned, to the Math 5640 and Math 6640 sections.