Scientific Computing, G63.2043/G22.2112
Spring 2000
Professor Leslie Greengard

Lectures 3-4

**Reading:** Chapters 3,4 in "Numerical Methods with MATLAB."

In my view, the material in Chapters 1-3 is hard to follow and I will review what I think the key ideas are from linear algebra. Don't struggle too hard reading chapter 3. You may be better off reviewing eigenvalue problems from whatever text you used in your linear algebra course. I will discuss what you need to know from the computational viewpoint in class. Do, however, try to understand the discussion of the Jacobi method (pp. 102 – 104).

I will also discuss two methods for least squares problems. They are not discussed in the text until Chapter 14, because the author takes a statistical point of view and wants to have completed his analysis of $\chi^2$.

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Skip the sections on **Spectral decomposition** and the **Singular Value Decomposition**

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**Lecture Topics:**

A) Orthogonality, projections and linear least squares
B) Eigenvalue problems

**Problem Set 2:** Due 2/10/00.

Problems 2.4 (a,c),2.5 (a,b),2.7,3.1,3.3
Problem 2.11, but (a.) should read ... to *estimate* the norms of $A$ and $A^{-1}$ ....

Extra credit: From the definition given in class, can you figure out what $\|A\|_1$ and $\|A\|_\infty$ are?