Numerical Analysis, II
MATH 862, Spring 2001

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SUBJECT: Totally independent of Numerical Analysis, I, Numerical Analysis, II will cover the subject Numerical Linear Algebra. The importance of scientific computation is growing day by day and numerical linear algebra plays a central role in scientific computation. It is almost always the case that a process of numerical computation is finally realized by numerical linear algebra even though the problem itself maybe nonlinear. Numerical linear algebra is also the ideal subject through which we can learn some important aspects of numerical analysis such as modern error analysis and vectorized computation and parallel computation. These are part of the reasons that we devote an entire semester to numerical linear algebra. The two most important themes of the course are numerical solutions of linear systems and numerical eigenvalue problems. We will also discuss singular value problems and least square problems. The algorithms that we will study include both direct methods and iterative methods. We will pay attention to both the mathematical foundation, including convergence and error analysis, and the practical implementation including vectorized and parallel computing, of these methods. Problem solving and some computer programming will be integrated parts of this course.

PREREQUISITE: Linear algebra. Some knowledge of real analysis can be very helpful, but is not a requirement. The students need to do some computer programming. Fortran is a preferred language. Any other computer language for large scale scientific computations will also do the job well. MATH 861 is NOT a prerequisite of MATH 862.