ENEE241/MATH242 Dr. Wolfe Review for First Hour Exam Spring 2004

Sections Covered on the Exam: 2.2, 2.3, 3.1, 3.2, 3.4 (up to Theorem 3.1), 8.1 (up to Example 8.2), 4.1, 4.2 (through Example 4.4).

Be able to:

1. Do arithmetic in a floating point system.
2. Compute machine epsilon in a floating point system.
3. Define overflow and underflow.
4. Cure catastropic cancellation.
5. Solve a system of linear equations by Gauss Elimination.
6. Factor a matrix A as $A = LU$.
7. Explain how the LU decomposition is used to solve $A\mathbf{x} = \mathbf{b}$.
8. Compute the condition number of a matrix and know its significance,
9. Use the bound $\|\mathbf{e}\|/\|\mathbf{x}\| \leq \text{cond}(A)\|\mathbf{r}\|/\|\mathbf{b}\|$.
10. Discuss why pivoting is essential in solving $A\mathbf{x} = \mathbf{b}$ by Gauss Elimination.
11. Evaluate a polynomial using Horner's method.
12. Compute Taylor polynomials for a given $f(x)$.
13. Compute polynomials interpolating a given data set
    (a) In the standard form by solving a system of linear equations.
    (b) In the Lagrange form.
    (c) In the Newton form using the divided difference table.