NUMERICAL METHODS IN ENGINEERING
EE 6481
Summer 2006
Assignment No. 1

Textbooks:

1. C. D. Cantrell, *Modern Mathematical Methods for Physicists and Engineers* (Cambridge University Press, 2000) There is a UTD Web site for this book, http://www.utdallas.edu/eecs/booksite/, in addition to the Web site for EE 6481, http://www.utdallas.edu/ cantrell/ee6481/

2. W. H. Press, B. P. Flannery, S. A. Teukolsky and W. P. Vetterling, *Numerical Recipes*, Second Edition (Cambridge University Press, 1992)

Supplementary References (not required):

1. D. Kahaner, C. Moler and S. Nash, *Numerical Methods and Software* (Prentice-Hall), TA345.K34 1989. This book is less useful and has more material than one might expect in an updated version of Ref. 2 (below), which this book purports to be. The software is probably worthwhile.

2. G. E. Forsythe, M. A. Malcolm and C. B. Moler, *Computer Methods for Mathematical Computations* (Prentice-Hall), QA297.F568. The purchase of this book is strongly recommended if you have not previously studied numerical methods.

3. G. Dahlquist, Å. Björck and N. Anderson, *Numerical Methods* (Prentice-Hall), QA297.D3313 1974. A standard textbook. Somewhat dated, but still very useful, especially for beginners.

4. L. Lapidus and J. H. Seinfeld, *Numerical Solution of Ordinary Differential Equations* (Academic Press), QA372.L27. Although this book is out of print, it is recommended if your project requires the solution of systems of ordinary differential equations.

5. L. Lapidus and G. F. Pinder, *Numerical Solution of Partial Differential Equations in Science and Engineering* (Wiley), Q172.L36 1982. This book is recommended if your project involves the solution of partial differential equations.

6. G. D. Smith, *Numerical Solution of Partial Differential Equations* (Oxford), QA374.S56 1978. A very readable introduction.

7. G. Sewell, *The Numerical Solution of Ordinary and Partial Differential Equations* (Academic), QA372.S4148 1988. A modern book by a member of the University of Texas at Austin faculty.

8. R. W. Hamming, *Digital Filters*, Third Edition (Prentice-Hall, 1989). A classic introduction that should be read by all physicists and electrical engineers.

Teaching Assistant:

Chongyang Chen ⟨cxc020400@utdallas.edu⟩

Grading Policy:

Grades will be determined by homework, a written midterm exam, and a written report on a significant computational project. When possible, the topic of the project should be chosen from the field of the student's graduate research or employment. The project should use an appropriate subset of the methods taught in this course. For this reason, the report should emphasize the numerical and computational properties of the algorithm used for the project, and not the engineering or scientific results obtained with the aid of that algorithm. You are encouraged to choose a problem from your dissertation research (if applicable) or other project in which you are strongly interested.

Homework Policy:

The acceptance of homework handed in after the due date is subject to Professor Cantrell's prior approval. You will be expected to hand in source code as well as output for problems that require programming. If at all possible, please program in FORTRAN, C or C++. Documentation will improve the readability of your code, and hence your grade.

Computer Usage:

You are encouraged to use the computer(s) with which you are familiar in your research group or at your place of employment, if at all possible. If such an arrangement is not possible in your case, please see Prof. Cantrell.

Reading:

Cantrell, Chapter 1 ("Representations of Numbers")
Press et al., Chapter 1

Supplementary Reading (not required):

Forsythe et al., Chapters 1 and 2

Problems:

Cantrell, Chapter 1, Problems 1.2.7, 1.2.12, 1.3.1–1.3.5

The above problems are due May 24, 2006.