Practice for Final Exam

August 10, 2008

The problems on the Final are more or less standard problems. Nothing like the last problem of the second midterm. So the best way to practice would be to make sure you can do problems from the book. You should also know how to do previous midterm problems. Here are some typical problems. You are strongly advised AGAINST doing all the problems mentioned here. Don't overwork yourself.

Sec 1.1 Ex 11-18
Sec 1.3 Ex 13-16
Sec 1.4 Ex 31-34
Sec 1.5 Ex 15
Sec 1.7 Ex 9-10, 15-19
Sec 1.8 Ex 11,20,32,33
Sec 1.9 Ex 7,19
Sec 2.2 Ex 31-32
Sec 2.8 Ex 7,23
Sec 2.9 Ex 5,13
Sec 3.1 Ex 9
Sec 3.2 Ex 25
Sec 4.1 Ex 5-8,11
Sec 4.2 Ex 31
Sec 4.3 Ex 33-34
Sec 4.4 Ex 7,9,27
Sec 4.5 Ex 24-26
Sec 4.7 Ex 5,7,13
Sec 5.1 Ex 15,31-32
Sec 5.2 Ex 9
Sec 5.3 Ex 11
Sec 5.4 Ex 7-10
Sec 6.2 Ex 9
Sec 6.3 Ex 9
Sec 6.4 Ex 9
Sec 6.5 Ex 5
Sec 6.7 Ex 3,11,21,23
Sec 4.2 Ex 13,18
Sec 4.3 Ex 25
Sec 4.4 Ex 13,17
Sec 4.5 Ex 21
Sec 6.1 Ex 19
Sec 6.2 Ex 9,17
Sec 9.1 Ex 9
Sec 9.4 Ex 22,27
Sec 9.5 Ex 11,13,35
Sec 9.6 Ex 3,5,7
Sec 10.2 Ex 15,19,27,31
Sec 10.3 Ex 9-12
Sec 10.4 Ex 9-12
Sec 10.5 Ex 1-3

- Make sure you can solve systems of linear equations and can find inverses of matrices.
- You should know how to nd a basis and the dimension of a vector space described in various ways. Defnitely make sure you understand the concepts of linear dependence/independence, span, subspace.
- You should know what an inner product is and how to work with inner products. In particular how to use Gram-Schmidt.

- What are row space, column space, null space of a matrix? How do these change when you do row operations on a matrix? Relations between dimensions of these spaces.
- What is a linear transformation and how can you find a matrix that represents it?
- What are eigenvalues and eigenvectors. How to use them to diagonalize matrices. Necessary and sufficient conditions for a matrix to be diagonalizable. How to find powers and exponents of diagonalizable matrices. E.g. take a diagonalizable matrix and raise it to the power 2008 or calculate e^A for an A.
- Which matrices can be orthogonally diagonalized? How can you do this?
- How can you solve a linear differential equation with constant coefficients? When must there be solutions? What are wronskians and what do they tell us?
- How can you solve systems of linear dierential equations. What you need to do in each case: real distinct eigenvalues, real repeated eigenvalues, complex eigenvalues.
- Find a Fourier series for a given periodic piecewise continuous function.
- Find a Fourier series converging to a given function defined on an interval. In particular find sine or cosine series.
- Solve partial differential equations using separation of variables. You should understand the method of separation of variables, not simply be able to use the final formulas for the solutions of the heat or wave equations.