

MATH 442 - TEST 2, FALL 2005

- Date: Wed, Nov 9 from 8:10 pm
- Room: 145 Altgeld Hall
- Chapters: 3 – 5
- Office Hours: Mon 3:30-4:30, Tue 10-11 and 3:30-4:30, Wed 3:30-4:30
in 227 Illini Hall
- No class on Wed, Nov 9 but study session in the classroom

It is very important for you to understand your lecture notes and homework thoroughly so that you can mimic them on the test.

You may bring one letter size of notes including formulas (one side). No formulas sheet will be given.

Checklist

- (1) Can you solve a diffusion equation with a source on \mathbb{R} (inhomogeneous diffusion equation)? How about a wave equation with a source on \mathbb{R} ?
- (2) Can you solve a diffusion equation on a finite interval using separation of variables with certain boundary conditions (Dirichlet, Neumann, Mixed, Periodic or Robin)? Of course, you need to know how to solve eigenvalue problem with certain BCs ($\lambda > 0$, $\lambda = 0$, $\lambda < 0$). In some cases you need to find eigenvalues graphically. Can you solve a wave equation on a finite interval by separation of variables?
- (3) Can you find Fourier sine, cosine and full series (real and complex forms)? When do you need to use Fourier sine series (cosine, full)? What is relation of even, odd and periodic extension with each Fourier series?
- (4) Can you use orthogonality of eigenfunctions with symmetric BCS?
- (5) Can you state definitions of pointwise, uniform and L^2 convergence of a series?
- (6) Can you state and use three convergence theorems?
- (7) What are Bessel's inequality and Parseval's equality? How can you use them?
- (8) Can you evaluate some numeric series using Fourier series with pointwise convergence or with Parseval's equality?
- (9) Using the method of subtraction (shifting the data), can you make inhomogeneous BCs homogeneous?
- (10) Can you use expansion method to solve inhomogeneous PDE on a finite interval with homogeneous BCs and initial conditions?