MATH 462 Section 0101 Fall 2006

Partial Differential Equations for Scientists and Engineers

Tu-Th 12:30-1:45, MTH 0401

Instructor

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Grader

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Objectives

This course is an introduction to partial differential equations (PDE). We will discuss first order equations, the heat equation, the wave equation and the Poisson equation, the last three being the prototype of second order equations. We will also discuss nonlinear equations of each type. We will develop the method of separation of variables and eigenfunction expansions, which lead to Fourier analysis. Qualitative properties and numerical methods will also be studied. This corresponds to Chapters 1 to 8 of [1]. MATLAB will be used mostly for graphical purposes and illustrative computation using [2]. You can access MATLAB in a WAM Lab, in a GLUE Lab, or on your PC, if you have the Student Version or the Student Edition of MATLAB. In the WAM and GLUE Labs, MATLAB is on the Sun workstations and PCs. The Student Version is available in the bookstores and on the MathWorks website `www.mathworks.com`.

Texts

[1] Walter A. Strauss, *Partial Differential Equations: An Introduction*, John Wiley and Sons (1992), ISBN 0-471-54868-5.

[2] Jeffery M. Cooper, it Introduction to Partial Differential Equations with MATLAB, Bikhaüser (1998), ISBN 0-8176-3967-5.

Grading Policy

The final grade will be based on homeworks (20%), quizzes (10%), two exams (20% each), and a final exam (30%). No make-up exams will be given, unless a written excuse is presented in advance and in accordance with University Policies. Computer exercises will use MATLAB. Homeworks are due before class starts. There will be a penalty of 10% for one day late, 20% for two days, and so on. Homework will not be accepted after one week.

Exam 1: $\approx$ Thursday Oct 19.

Exam 2: $\approx$ Tuesday Nov 21.

Final Exam: §§1-5 (Tuesday Dec 19, 1:30-3:30PM)

Prerequisites

Calculus MATH 240, 241 and Elementary ODE MATH 246 (or equivalent).