Mathematics 4582a1 Fourier Series and Boundary Value Problems Fall, 1997

Course Description

Class meetings: MWF 12, Skiles 140

Instructor: Evans Harrell, Skiles 134, tel. 894-4312, e-mail harrell@math.gatech.edu

Office periods: MWF 1:00-2:00

Texts: The text consists of the on-line book by Professors Harrell and Herod, which is available on the World Wide Web or on diskette.

Prerequisites: Ordinary differential equations at the level of Mathematics 3308.

Grading, structure, and requirements. Wednesday and Friday will be lecture days, and Mondays will be a mixture of lectures, problem sessions, and computational work. Thus on Mondays homework will be due, and in addition there may be a quiz, which counts. There will be scheduled exams on **Monday, 13 October**, **Monday, 3 November**, and **Monday, 24 November**. (Calendar).

Goals: After taking this class, you should understand the following.

How to use *orthogonal sequences* to study vectors, differential equations, and functions.

The use of *Fourier series* for studying periodic functions and periodic equations.

Eigenvalues, eigenfunctions, *special functions*, and their uses.

The origins and general properties of the heat equation, the wave equation, and other partial differential equations.

The concept of *linearity* and its relationship to differential equations.

The rôle of symmetries in simplifying the solution of a partial differential equation, and the technique of *separation of variables*.

The use of high-level software (Maple, Mathematica, or Matlab) as a tool for solving these problems.

We shall rapidly review some concepts from linear algebra and ordinary differential equations before proceeding towards these goals.

C**omputer and network use**.

High level software including Maple, Mathematica, or Matlab, will often be used for calculations in this course, and this will allow us to progress further than was possible in the past. They will not be required, however, and students will be able to do the entire course with paper calculations, if they so desire.

A newsgroup called git.math.class.harrell has been created on the Georgia Tech computer system. If you are not familiar with newsgroups, they operate like electronic bulletin boards, and are accessible from any part of the Internet. The newsgroup is useful, but is not a required part of the course. I will post assignments and other helpful materials on the newsgroup, and students are encouraged to post such things as questions and advice about assignments. For private matters and questions for me personally, you can reliably use electronic mail. In addition, these Web pages will have other useful material and will provide ways to contact me

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Link to:

- The text
- The home page for Math 4582 A1
- Evans Harrell's home page
- The School of Math on-line resources

Write to the Prof