Course Description
D26: Differential Equations

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Time: MWF 1:00-2:00pm
Location: Lunt 101

1. **Introduction**

   This is a one-quarter introductory course on the theory of differential equations, with emphasis on the theory of partial differential equations. We plan to start with some interesting examples of partial differential equations and a brief review of the theory of ordinary differential equations. This is followed by a systematic introduction to the linear theory and the nonlinear theory of partial differential equations: the first order equations and the second order equations. Some important ideas and methods in this field will be presented. Canonical linear and nonlinear models, such as the wave equations, the transport equations, the Hamilton-Jacobi equations, the Hopf-Burgers equation, the Euler equations, and the Navier-Stokes equations will be analyzed in detail.

   We will try to make this course self-contained. Familiarity with basic PDE theory is helpful, but not necessary. Advanced calculus and linear algebra are the only essential prerequisites.

   Basic references are:

   1. "Partial Differential Equations" by Lawrence C. Evans, Graduate Studies in Math. **19**, Amer. Math. Soc.: Providence, 1998.

   2. "Partial Differential Equations" by Fritz John, 4th Edition, Springer-Verlag, New York, 1982.

2. **Contents**