

MATH 400: Applied Analysis

Topics

- Method of Characteristics for First Order Equations: Traffic Flow; Shocks; Eikonal Equation, Modeling.
- Sturm Liouville Theory, Separation of Variables, Eigenfunction Expansions, Special Functions (Bessel functions, etc.)
- Diffusion Equation and Modeling: Analysis by Eigenfunction Expansion, Laplace and Fourier Transform, Max-Min principle.
- Wave Equation and Modeling: Analysis by Eigenfunction Expansion, Laplace and Fourier Transform; D'Alembert's formula in 1-D and multi-dimensions.
- Laplace's Equation: Qualitative Properties, Eigenfunction Expansions, Fourier Transforms.

Prerequisites

- Differential Equations: Math 215/316 or 255/257;
- Complex variables: One of M300 or M305.
- Some exposure to Physics is helpful. M301 is also helpful.

Course Notes

- Written notes for the course as well as HW's and HW solutions will be on my course webpage: <http://www.math.ubc.ca/~ward/teaching/math400.html>

Book References: (No Official Text Required)

- Strauss: Partial Differential Equations: An Introduction.
- Haberman: Applied Partial Differential Equations
- Carrier and Pearson: PDE's
- Pichover and Rubinstein; Introduction to Partial Differential Equations, Cambridge U. Press.

Instructor and Office Hours

Michael Ward, Room 1217 Math Annex building: 822-5869.

Office Hours: to be arranged

Grading

There will be 1 midterm and (roughly) weekly homework assignments. The grading scheme is 30% for the midterm, 20% for the homework, and 50% for the final exam. The Midterm date will be in late October. **No late homeworks will be accepted.**