Applied Differential Equations II
Fall, 2019, MA401

Instructor: K. Ito
Phone/Office: 515-7140 / SAS 3270

This course is an introduction to partial differential equations including Wave, Heat and Laplace equations. Solutions by separation of variables and expansion in Fourier Series or other appropriate orthogonal sets. Sturm-Liouville problems. Introduction to methods for solving some classical partial differential equations.

Textbook: John M. Davis, "Introduction to Applied Partial Differential Equations ".

Homework: Accumulated Homework Assignments given throughout the semester

Two Term Exams) in class

Final Exam (Comprehensive)

Grade: 25×2 points (Term Exams), 35 points (Final Exam) and 15 points (Homework).

Lectures:

- Chapter 1 Introduction to PDEs. — Examples, Initial Boundary Value problems, Characteristic (ODEs) method for Transport equations.
- Chapter 2, Fourier Methods: Separation of Variables. — Eigenvalue-Eigenfunctions for Heat and Wave equations. Orthogonality and Boundary value problems. Time Dependent Boundary conditions.
- Chapter 3, Fourier series Theory. — Fourier cosine and Sine series. Error Analysis and Convergence Theorems. Basic L^2 theory.
- Chapter 4,General Orthogonal Series Expansions: Strum-Liouville Theory. Orthogonal functions and Generalized Fourier Series.
- Chapter 5, PDEs in High Dimensions, 2D Laplace, Heat and Wave Equations.
- Chapter 6, PDEs in Other Coordinate Systems. — PDEs in Polar, Cylindrical and Spherical Coordinates.

Office Hours: TTh 1:00-2:00 p.m., otherwise Appointment.