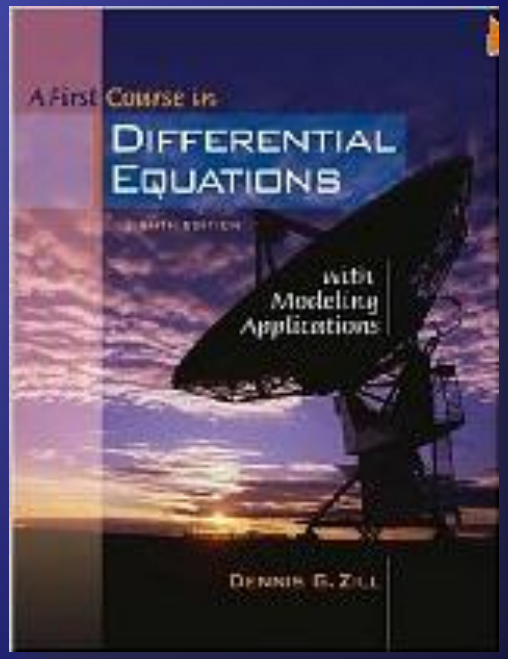
Winter 2013

MA361 DIFFERENTIAL EQUATIONS



Syllabus

- Instructor: Roxin Zhang
- Meeting Time: MWR 12:00 – 12:50 pm, WS 3202
- Text: A First Course in Differential Equations 8e
- Prerequisite: MA265 and MA211
- Office Hours: MWRF 11 – 11:50 am
- Software Used: Maple (Install Maple at your earliest convenience)

What is a differential equation?

- An equation involving functions and their derivatives.
  Example:

  The growth rate of a deer population is proportional to the population size at any time,
  namely,

$$\frac{dP}{dt} = kP$$

  where P = population size, t = time, k = a constant.

We would like to know how does the population change.

What is a differential equation?

- Another example, the temperature of a cup of coffee is proportional to the difference of the temperature of the medium and the temperature of the coffee:

$$\frac{dT}{dt} = k(T_m - T)$$

where T = temperature of the coffee, Tm = temperature of the medium, t = time, k = a constant.

We would like to know how is the temperature changing over time.

Contents

- Introduction to Differential Equations
- First Order Differential Equations
- Modeling with First Order Differential Equations
- Higher Order Differential Equations
- Series Solutions and the Laplace Transform
- System of Liner First Order Differential Equations

Homework and Tests

- Exercise problems will be assigned after each lecture. Students are expected to do the homework and participate in the discussions during the following lectures.

- There are three types of tests:
  Quizzes - quizzes (take-home or in-class) will be given on a regular basis.
  Midterm - Tentatively scheduled in the 7th week.
  Final exam - A comprehensive exam + an essay. Monday, April 29, 12:00 - 1:50.

Essay

- Close to the end of the semester, students is required to write and present a formal essay on the applications of ordinary differential equations to solving real-world problems. Analyze an apply ordinary differential equation and its solution techniques in the context of an example.

Attendance and Grading

- Attendance will be checked randomly and will be calculated into the grade. Remember that the poor attendance is one of the primary causes of failing a class.

- Grades are calculated as a weighted average of the quizzes, midterm, final exam and the attendance. The weights are:
  Assignments 50 % , Midterm 20 %, Final exam 25 %, Attendance 5 %
- Grading Convention:

  A 95%, A- 90%, B+ 85%, B 80%, B- 75%, C+ 70%, C 65%, C- 60%, D+ 55% etc.

ADA Statements

- If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Disability Services Office by: coming into the office at 2001 C. B. Hedgcock; calling 227-1700; or e-mailing disserv@nmu.edu. Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state, and University guidelines.