

Notes: Last 4 weeks of class

We'll start our final lab this week (a little early). The final lab in this course is to construct and give a short mathematics presentation using the "Beamer" package in LaTeX (Beamer produces a presentation much like PowerPoint).

Here are some guidelines for the lab:

- The topic should utilize either Matlab or Maple.
- The oral presentations will be 5 minutes each (split it between you), and we'll spend the last day of class doing them.
- You'll write up your presentation in Beamer (we'll start this next week).
- You'll have a full write up in "regular" latex that you'll turn in to me; the oral part will focus on one particularly nice or fun aspect of what you've looked at. For example, the full write-up will include details and code that you do not (should not) include in your presentation.

Topic Ideas

There are several sources for projects. Here are some ideas- I'm open to other ideas as well, but please discuss with me before starting.

- Using Maple in Optimization and Integration (Current if you're taking Calc 3 right now). In particular, look at Chapters 14 and 15 of the online text, use Maple to solve selected problems.
- Using Maple in Vector Calc. Describe how to use Maple to compute things like divergence, curl, line integrals and surface integrals. (Ch 16 of the online text- You probably should only do this if you've finished Calc 3).
- Use Maple to solve a differential equation using a power series (Should have had or be currently in Math 244 for this one!)
- One Chapter from "Experiments with Matlab" (link on the class website). These are: (6) Fractal fern¹, (8) Exponential Function, (10) Magic Squares, (12) Game of Life, (13) The Mandelbrot set, (14) Sudoku, (15) Ordinary Differential Equations², (17) Orbits.
- One Chapter from "Numerical Computing": (Ch 6) Quadrature (numerical integration), (Ch 8) Fourier Analysis³
- Work through a past lab: (1) The Koch Snowflake (Schueller, 2005, Lab 5),

¹Best if you've had some matrix algebra in your past.

²Best if you have had or are currently in Math 244.

³Best if you've had some experience with complex numbers.