

MAT360 Project 2 (Spring 2017)

Directions: While you may collaborate and discuss with others, your group's computer work and report should be **your own**. You may use whatever software you wish for the calculations. However your work should be summarized in a single Mathematica notebook. Calculations by Mathematica or by hand may be appended, but the summary should be essentially complete.

Project Groups (randomly chosen, no intersection with previous groups):

- a. Courtney, Brooke, Kara
- b. Alyssa, Madison, Zach
- c. Michael M, Mike, Trey
- d. Lauren, Patrick, Katie
- e. Joey, Leah, Michael W.

You have your choice of one of two projects:

- a. create an adaptive integrator and plotter (see sections 5.5.2 and 7.5); or
- b. a project of your own, to be agreed upon with me. I had suggested a spline project (e.g. creating your own "sig-mac" (signature machine)); alternatively you might do something similar to what we did when we created a spline replacement for e^x (and its inverse, $\ln(x)$). But it doesn't have to involve splines. It might involve linear algebra, for example, since we skipped that chapter. It can be very creative, too.

I'm assuming that most of you will opt for the first project, as it is more directed, but I want you to feel free to propose something else. If you choose the first, then you are to do the following:

Adaptive Project

- a. Computer problem #3, p. 209.
- b. Computer problem, p. 304.
- c. Build a bridge between the two ideas: the plotter strategy can be used as an integrator; the integrator strategy suggests points to a plotter. How do the two strategies compare on the same functions?
- d. Create a library of at least three different function on which the methods fail, and three different functions on which the methods succeed dramatically (by comparison with using evenly spaced intervals). Explain the advantages and disadvantages of your implementation and the strategies.

As mentioned in class, your notebook should look like a report, including each method's description and implementation, and results and conclusions. Make it look nice!