Math 686: Chapter 4 Homework – Spring 2020
Due: Tuesday, March 3, 2020

Note: In the problems below you will be asked, among other things, to characterize the linear stability domains for a given scheme applied to $y' = \lambda y$, $y(0) = 1$. You can do this analytically or numerically (I would recommend having a numerical approach for at least some of these cases). You should describe the linear stability domain in the complex plane (i.e. in general λ is a complex number). Helpful Matlab commands include `contourf`. Also, note `sqrt(-1)` gives you the complex number i.

1. Characterize (sketch, draw, describe, ...) the linear stability domains for Heun's method.

2. Exercise 4.6. In addition to the question about A-stability, describe the linear stability domains for these schemes as well.