

Math 4560 Homework for Chapter 7

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Due Friday October 21.

1. Again, the exercises for this chapter are excellent. You should read them all. You might get excited. If you do get excited, please let me know. I will be happy to discuss solutions of interesting problems.
2. Problems to hand in: 7.1.8, 7.2.7.
7.3.3 (Hint: Mimic 7.3.1.) Continuation of 7.3.3: Use a computer to draw a picture of the limit cycle in the phase portrait of 7.3.3. Also, hand in the following problem.
3. Use a computer to verify the bifurcation diagram given in Figure 7.3.7 page 209 for the system $\dot{x} = -x + ay + x^2y$, $\dot{y} = b - ay - x^2y$. The ultimate solution would be to write a program that would draw the bifurcation diagram. But, at least show by taking some set of (a, b) points that the diagram predicts the correct answer. How does the amplitude of the limit cycle change as the parameters approach the bifurcation curve? Hand in some pictures and also **some explanation of what I am supposed to see in your pictures**. You must always do this when presenting graphical information: tell the reader what they are supposed to see.