Math 558      Applied Dynamical Systems      Winter 2023

hw1  , due: Monday, January 30, 4pm (upload to Gradescope from within our Canvas site)

The text contains answers and hints to selected problems on page 290.

When asked to sketch a bifurcation diagram, you may do it by hand or turn in a computer-generated picture, but be prepared to do such sketches by hand on an exam.

Write up the solutions neatly; show your steps and explain what you are doing.

0. (optional) Give a brief description of your academic background and research interests. If you work in a lab or research group, please give your supervisor's name and describe your project. One paragraph is fine.

Chapter 1, page 38

1. Q1.1 transcritical bifurcation

hint : consider 3 cases, $a > c, 0 < a < c, a < 0$

2. Q1.3 another transcritical bifurcation

hint : consider 3 cases, $a < -b^2, -b^2 < a < 0, a > 0$

3. Q1.6 folium of Descartes

4. Q1.8 particle on a rotating wire

5. Q1.12 stable limit cycle