

MA573 - Fall 2018 Homework 9 - Due November 26th

Strogatz Problems

Section 6.5: 19

Section 6.7: 3

Section 7.2: 2, 7, 12

Section 7.3: 1, 10

Additional Problems

Problem 1: Consider the differential equation

$$\begin{aligned}\dot{x} &= y, \\ \dot{y} &= \lambda - x^2.\end{aligned}$$

Using a conserved quantity and/or reversibility, draw the phase space for the three cases $\lambda < 0$, $\lambda = 0$, $\lambda > 0$. Describe in words what qualitatively changes in the dynamics for each case.