TOPICS COVERED

8. Bifurcations in the Plane
   Hopf Bifurcations
   Supercritical, subcritical, degenerate
   Examples in polar coordinates
   Saddle-node Bifurcations
   Transcritical and Pitchfork Bifurcations

9. Lorenz System
   Properties
   Volume contraction
   Bounded trajectories
   No stable Equilibria if $r > r_H$
   No stable Limit cycles if $r > r_H$
   Sensitive dependence on initial conditions
   Definition of chaos
   Definition of an attractor

Reading: Strogatz, Sections 8.0-8.2, 9.2-9.4

1. Problem 8.1.1
2. Problem 8.1.6
3. Problem 8.1.7
4. Problem 8.1.10
5. Problem 8.4.2
6. Problem 9.2.6(a)
7. Problem 9.3.8