Problem

(30 points) Do Exercise 3.2.8(c) on page 137 of Guckenheimer and Holmes (ignore the "describe their bifurcations" phrase). As in the previous problem, sketch graphs of the center and stable subspaces and the center manifold, and indicate the stability type of the equilibrium. Use numerical software to plot the center manifold approximation along with some representative trajectories of the system's dynamics.

(Exercise 3.2.8(c)) Compute the reduced systems on the center manifold to third order for the following maps and describe their bifurcations.

$$(c) \quad (x, y) \mapsto \left(y, -\frac{1}{2}x + \frac{3}{2}y - y^3 \right)$$

Notes

Solution