

# Nonlinear Phenomena: Homework 5

Reading: §7.1-7.4

Due May 28, 2013

## **Problem 1 (Gradient Systems)**

Strogatz 7.2.5, 7.2.6, 7.2.7 (7.2.7 should read "Exercise 7.2.5(b) implies...")  
(Hint: read through all 3 problems before starting.)

## **Problem 2 (Lyapunov Functions)**

Strogatz 7.2.10, 7.2.12

## **Problem 3 (Poincaré-Bendixson Theorem)**

Strogatz 7.3.3, 7.3.8 (Hint: think "donut".)

## **Problem 4 (Liénhard's Theorem)**

Strogatz 7.4.2 (Hint: sketch  $f(x)$  and  $g(x)$ , to start.)