

Nonlinear Phenomena: Recitation 4

Reading: §6.1-6.3, 6.5-6.6, 6.8

Discussion Problems, May 10 and 13, 2013.

Discussion 1 (§6.1 Phase Portraits)

Strogatz Problem 6.1.5.

Strogatz Problem 6.1.12.

Consider the following two functions for \dot{x} and \dot{y} :

$$f_1 = a \cdot y \cdot x(x - 1)$$

$$f_2 = b \cdot x(x - 1)$$

In one case, $\dot{y} = f_1$ and $\dot{x} = f_2$; in the other, consider $\dot{y} = f_2$ and $\dot{x} = f_1$. (Let a and b simply be either +1 or -1, as appropriate to meet each of the two cases...)

Discussion 2 (§6.2 Existence and Uniqueness)

Strogatz Problem 6.2.1.

Discussion 3 (§6.3 Linearization and Fixed Points)

Strogatz Problem 6.3.10.

Discussion 4 (§6.8 Index Theory)

Strogatz Problem 6.8.9.

Partial answer at back of book...

(Note: This problem may be helpful toward HW4 problem 6.1.13.)