Homework 6

Math 469 (section 500), Spring 2019

This homework is due on Thursday, February 21.

0. Read Section 2.7

1. This problem concerns the relationship between *locally stable* equilibria (page 39) and *sensitive dependence on initial condition*[1] (page 60). For this problem, assume that $\bar{x}$ is an equilibrium of a difference equation $x_{t+1} = f(x_t)$, where $f : I \to I$ is a function (for some interval I).

   (a) Complete the following sentence (by negating the definition): *The function f does* **not** *have sensitive dependence on initial condition x_0 if ....*

   (b) Prove or disprove: *If $\bar{x}$ is locally stable, then f does* **not** *have sensitive dependnce on initial condition $x_0 = \bar{x}$.*

   (c) Prove or disprove: *If f does* **not** *have sensitive dependnce on initial condition $x_0 = \bar{x}$, then $\bar{x}$ is locally stable.*

2. Section 2.12 #16–18, 20

3. Is anything in Sections 2.1–2.7 related to the paper you are reading for the final project? Explain briefly.

[1] In Definition 2.7 on page 60, "an integer k" should be "a nonnegative integer k".