

**Math 3F03, Fall 2014**  
**Assignment 2**

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This assignment is due on **Wednesday, October 15**, in class at the beginning of lecture. **Late assignments will not be graded.**

You must show your work and justify your assertions carefully in order to receive full credit.

Page references refer to the course textbook, *Differential Equations, Dynamical Systems, and an Introduction to Chaos* by Hirsch, Smale, and Devaney, Third Edition.

- 1.) Page 57, exercise 2, parts (i) and (vi).
- 2.) Page 58, exercise 5.
- 3.) Page 58, exercise 6.
- 4.) Page 59, exercise 11.
- 5.) Page 59, exercises 13.
- 6.) Page 59, exercise 14.
- 7.) Page 72, exercise 6.
- 8.) Using an argument similar to that found on page 67-70 of your textbook, prove the conjugacy of the systems  $X' = A_i X$  where  $i = 1, 2$  and  $A_i$  is a  $2 \times 2$  hyperbolic matrix having two (not necessarily distinct) eigenvalues with positive real parts. You may further assume that each eigenvalue of  $A_i$  has a geometric multiplicity equal to its algebraic multiplicity. For the purposes of this assignment it will be sufficient to produce a conjugacy  $H$  and show that it takes solutions of one system to solutions of another, *you do not need to demonstrate that  $H$  is a homeomorphism.*