

HOMEWORK 6

Due Nov 4

1. Exercise 12 page 70
2. Recall that if p is a regular point (nonsingular) in the α or ω limit set, then the trajectory through it is called a limit orbit. Sketch a planar system having the following: (not all at once)
 - (a) a trajectory through x with $\alpha(x) = \omega(x) = \{p\}$ but $x \neq p$.
 - (b) a trajectory through x such that $\omega(x)$ consists of one limit orbit
 - (c) a trajectory through x such that $\omega(x)$ consists of two limit orbits and one singular point
 - (d) a trajectory through x such that $\omega(x)$ consists of two limit orbits and two critical points
3. Exercise 13 page 83
4. Find all the fixed points and their stability for the following systems
 - (a) $x' = x(2 - x - y)$, $y' = y(3 - x - 2y)$
 - (b) $x' = y$, $y' = z$, $z' = 1 - x^2 - 2y - z$
 - (c) $x' = y^2 - x$, $y' = x + y^2$
 - (d) $x' = a - x + x^2y$, $y' = b - x^2y$, where a, b are positive parameters.