

#not okay to post

Anusha Nagar, Homework 23, 11.21.2021

(1) The part I got confused on was the criterion for fixed points for continuous time. I had the correct procedure for the rest. I misremembered & thought continuous & discrete find fixed/equilibrium points the same way, but remembered the difference between the two for stability.

(i) For  $x'(t) = 3x(t)(1-x(t))$   
Find FP & SFP

$$\begin{aligned}\text{FP: } F(x) &= 3x(1-x) \\ 3x(1-x) &= 0 \\ 3x - 3x^2 &= 0 \\ x(3-3x) &= 0 \\ x &= 0, 1\end{aligned}$$

$$\text{SFP: } 3-6x = F'(x)$$

$$F'(0) = 3$$

$$F'(1) = -3 \Rightarrow \text{negative} \Rightarrow \text{stable}$$

$$\text{FP} = \{0, 1\}, \text{ SFP} = \{1\}$$

(ii)  $x'(t) = -7x(t)$

$$\text{FP: } F(x) = -7x$$

$$F(x) = 0 = -7x$$

$$\text{FP} = \{0\}$$

$$F'(x) = -7$$

$$\text{SFP} = \{0\}$$

(2) We are making progress on our project