Mathematics 172

Quiz 10 Name: Key

You must show your work to get full credit.

A population of algae in a tank grows by

$$A_{t+1} = .2A_t e^{.5A_t(3.95-A_t)}$$

where A_t is the number of grams of algae t days after the algae is added to the tank. We wish to analyse this model by use of our calculators.

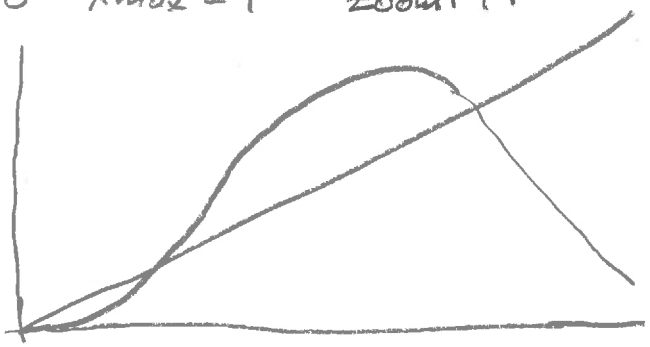
1. What two functions do we wish to use for \Y$_1$ and \Y$_2$.

\Y$_1$ = .2 X e^(.5 X (3.95 − X))

\Y$_2$ = X

Plot these functions with $0 \le x \le 4$ and draw a rough sketch of the result here:

Xmin=0 Xmax=4 ZoomFit



2. What are the equilibrium points. Given your answer to 3 decimal places.

Use 2nd calc 5: intersect

Equilibrium points are: 0.000, 1.149, 2.801

3. Use your calculator to find dy/dx at the equilibrium points and say if they are stable or unstable.

point 0.000 dy/dx= .200 (Stable) or unstable stable

point 1.149 dy/dx= 1.948 Stable or (unstable) unstable

point 2.801 dy/dx= −1.332 Stable or (unstable) unstable.