

Differential Equation: Homework #11

Due on November 23th, 2015 at 3:10pm

Professor Heather Lee Section 061

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Problem 1

7.3 - 17

$$\begin{bmatrix} 3 & -2 \\ 4 & -1 \end{bmatrix}$$

$$(3 - \gamma)(-1 - \gamma) - (-2)4 = 0$$

$$(\gamma - 1)^2 = -4$$

$$\gamma_1 = 1 + 2i$$

$$\gamma_2 = 1 - 2i$$

Plug it in to the original matrix, for $1+2i$ we get

$$(2 - 2i)v_1 - 2v_2 = 0 \quad 4v_1 + (-2 - 2i)v_2 = 0$$

Solve it

$$v_1 = \begin{bmatrix} 1 \\ 1 - i \end{bmatrix}$$

Same for v_2

$$v_2 = \begin{bmatrix} 1 \\ 1 + i \end{bmatrix}$$

Problem 2

7.3 -20

$$(1 - \gamma)(-1 - \gamma) - 3 = 0$$

$$\gamma = \pm 2$$

when $\gamma = 2$

$$v_1 = \begin{bmatrix} \sqrt{3} \\ 1 \end{bmatrix}$$

when $\gamma = -2$

$$v_2 = \begin{bmatrix} 1 \\ -\sqrt{3} \end{bmatrix}$$

Problem 3

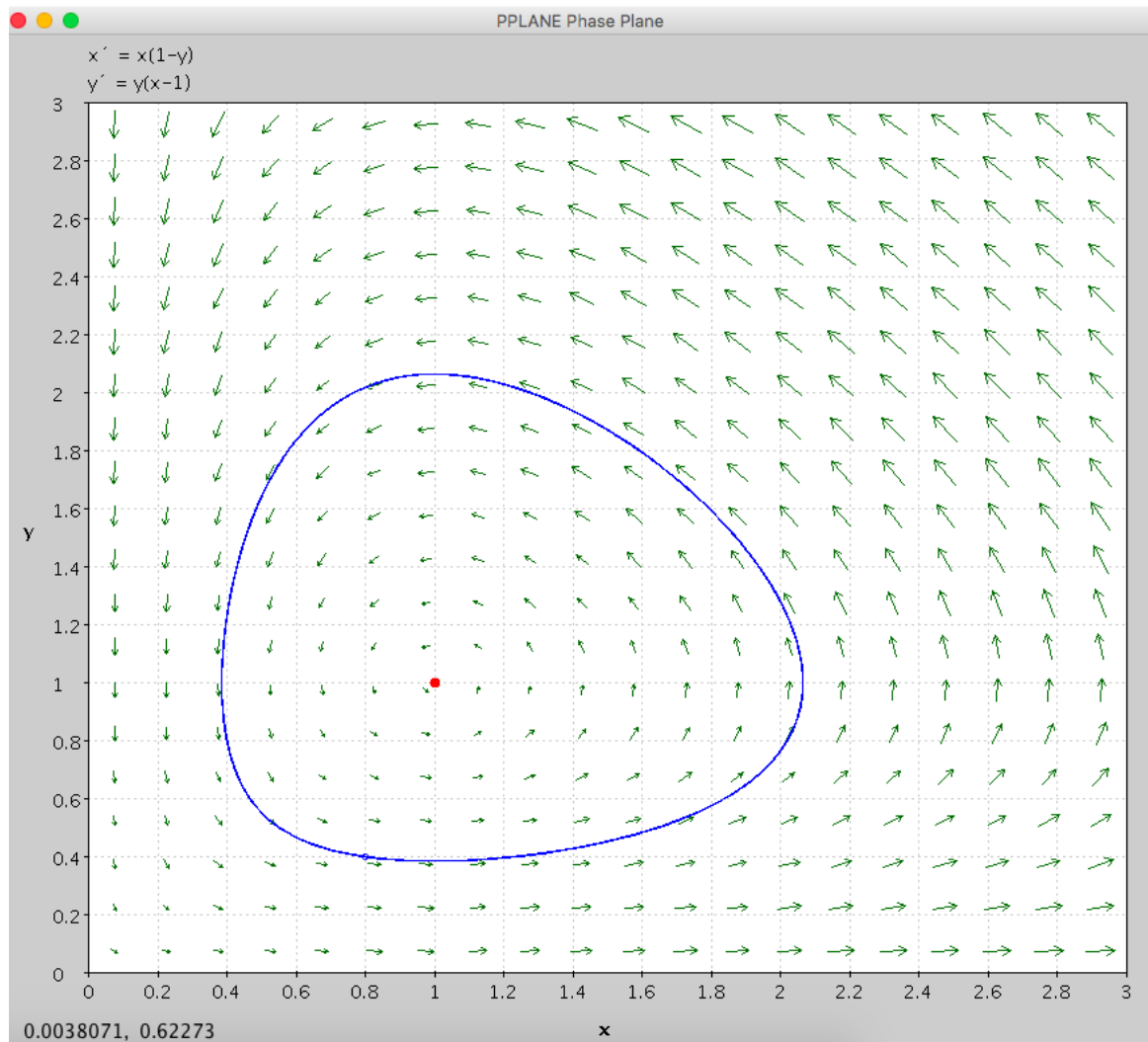
7.5-1

$$\begin{bmatrix} 3 & -2 \\ 2 & -2 \end{bmatrix}$$

Problem 4

Project 3

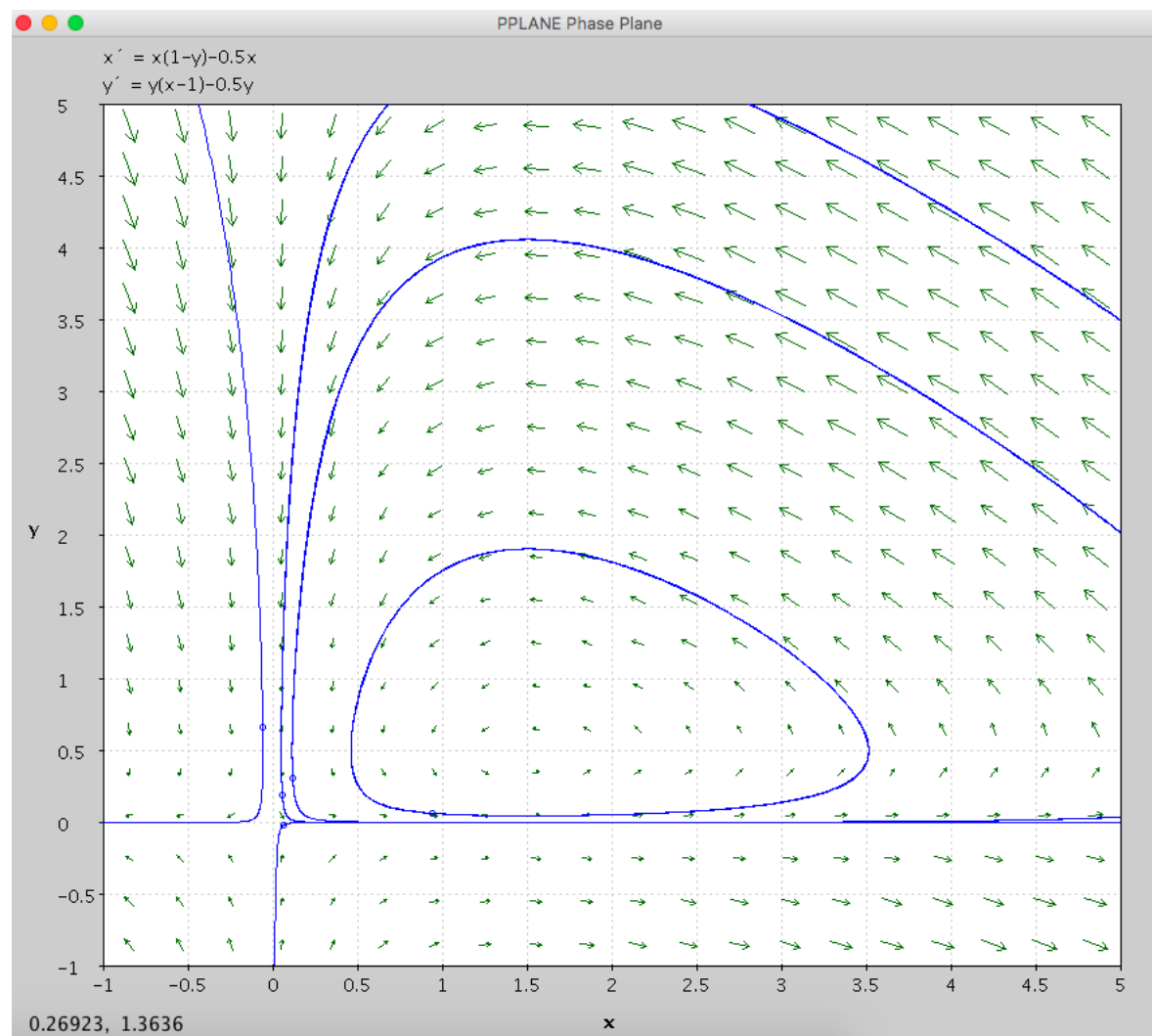
1



From the

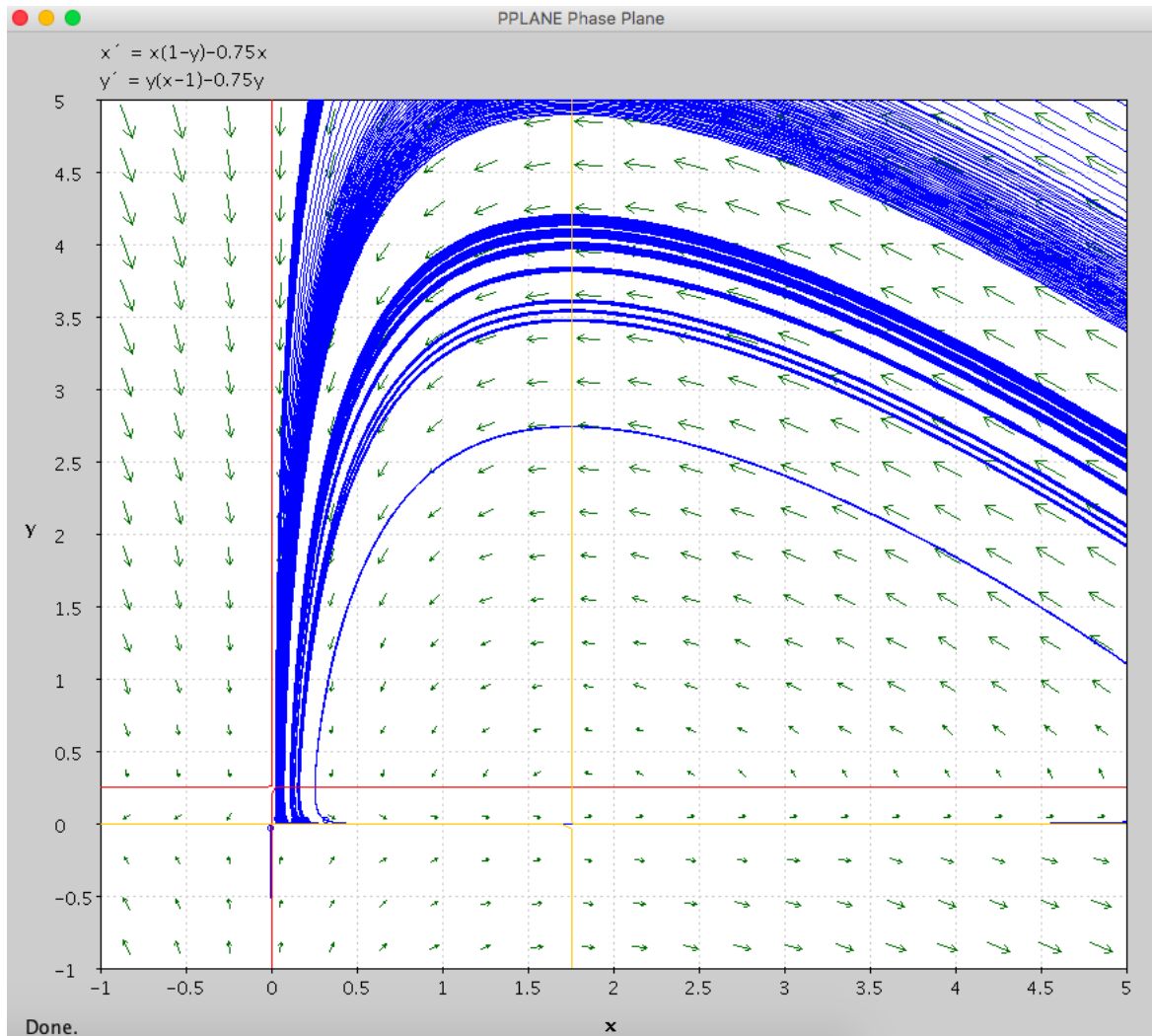
graph we could see the x is never less than 0.3million(300,000) so it's not eradicated as well. And the ladybug (y axis) is greater than 2 so it will exceed 2million

2



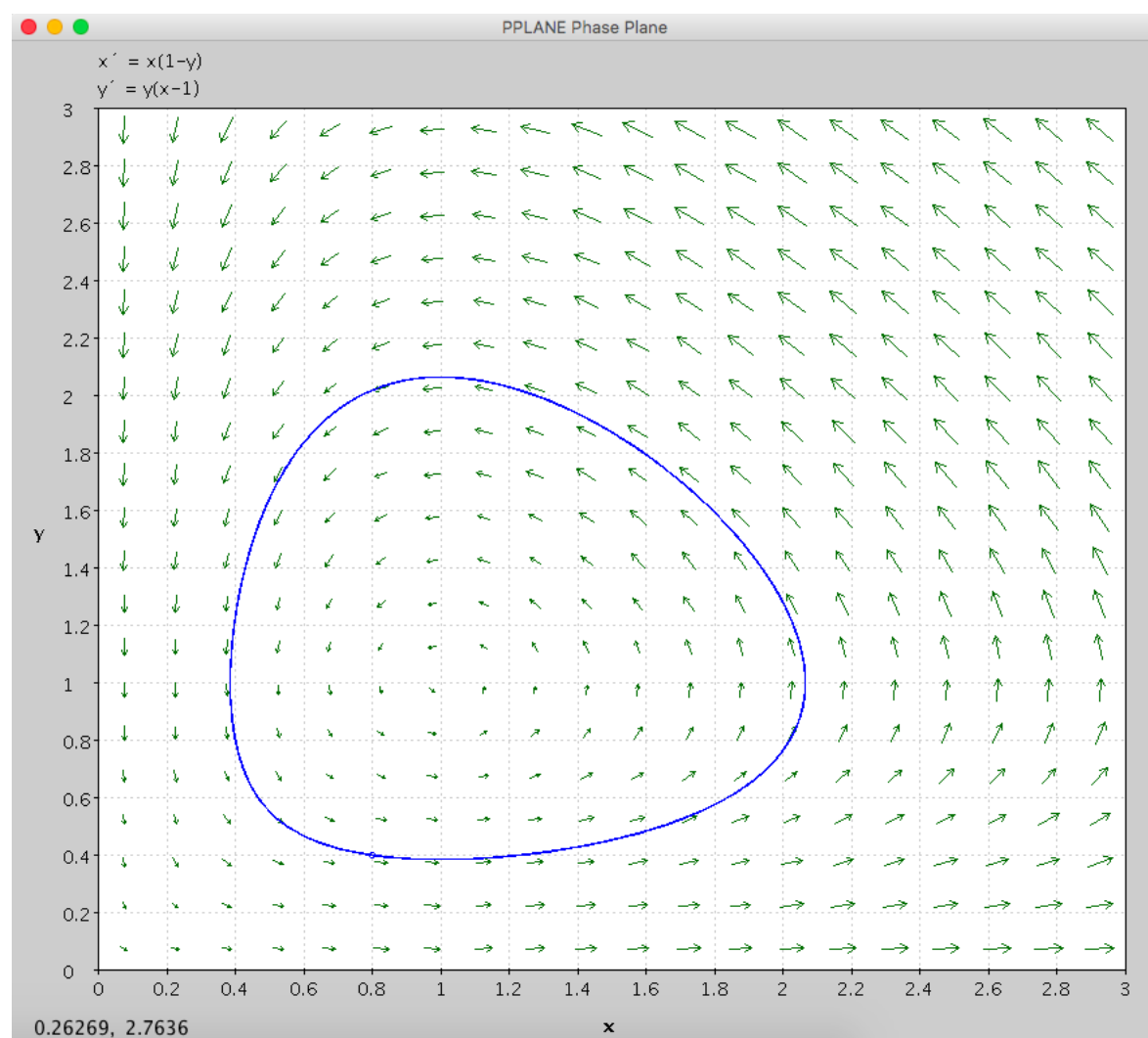
From the

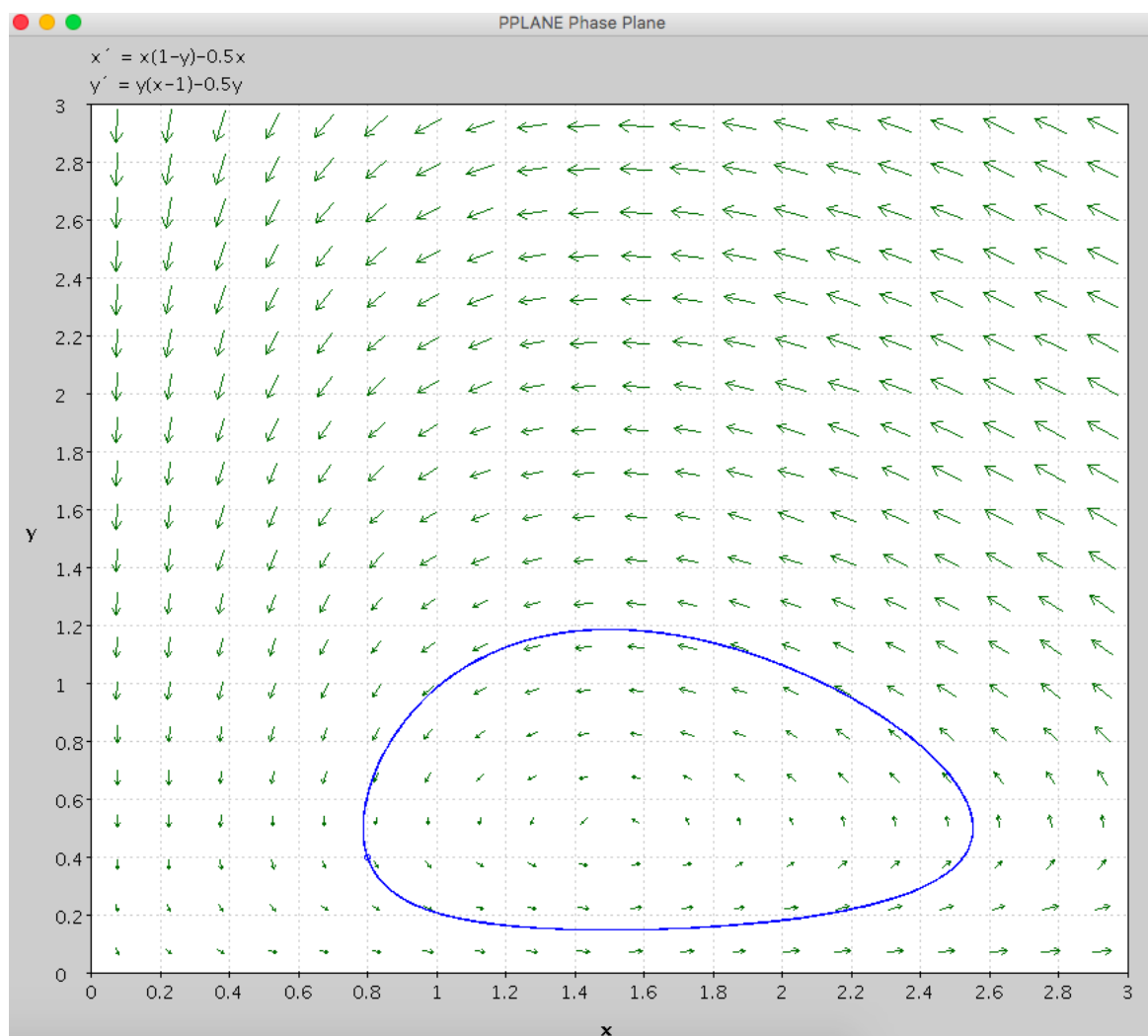
graph we could see that the x is never becoming 0 so it won't be eradicated for $s = 0.5$

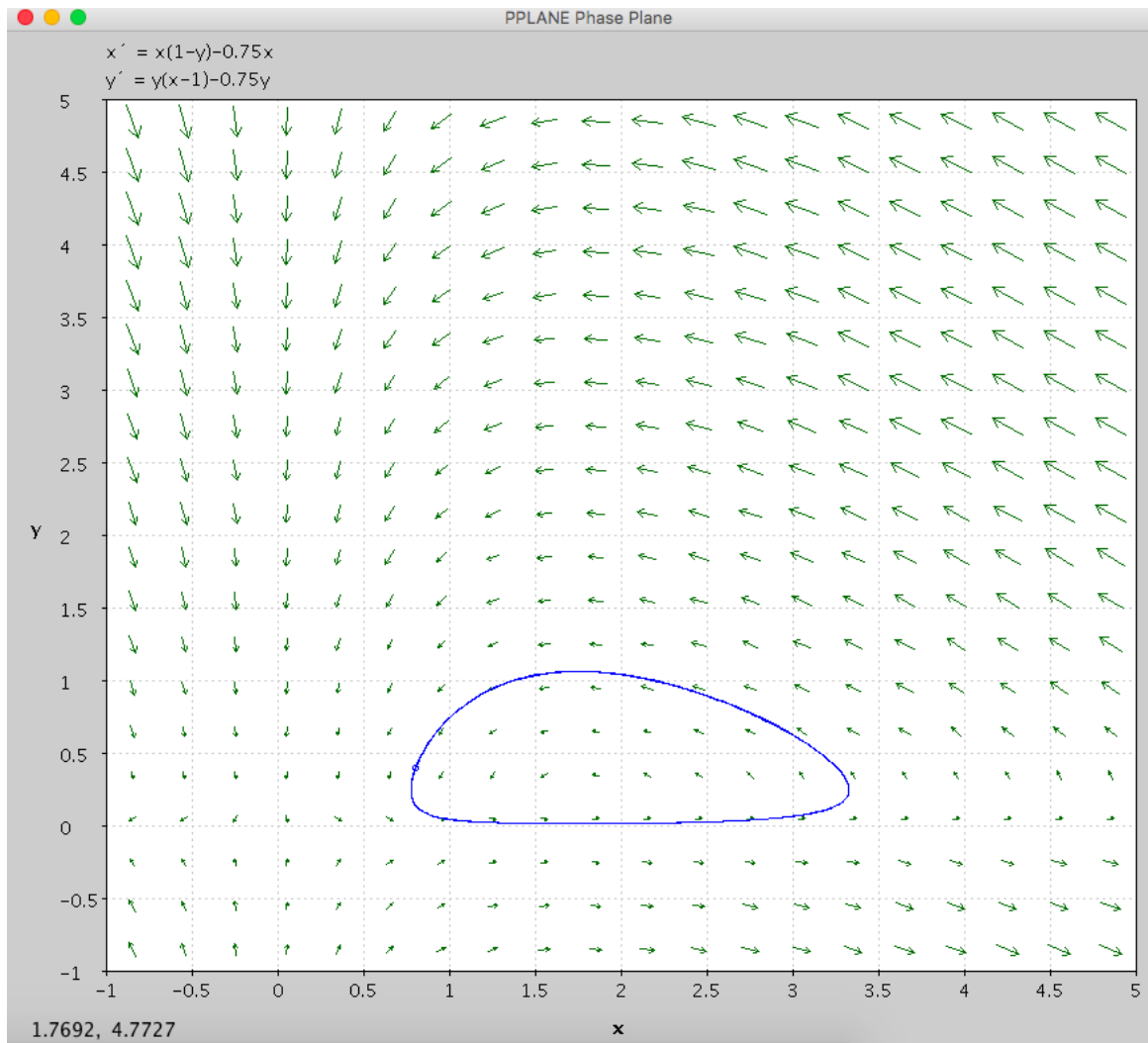


From the graph we could see that the x is never becoming 0 so it won't be eradicated. as well for $s=0.75$

3



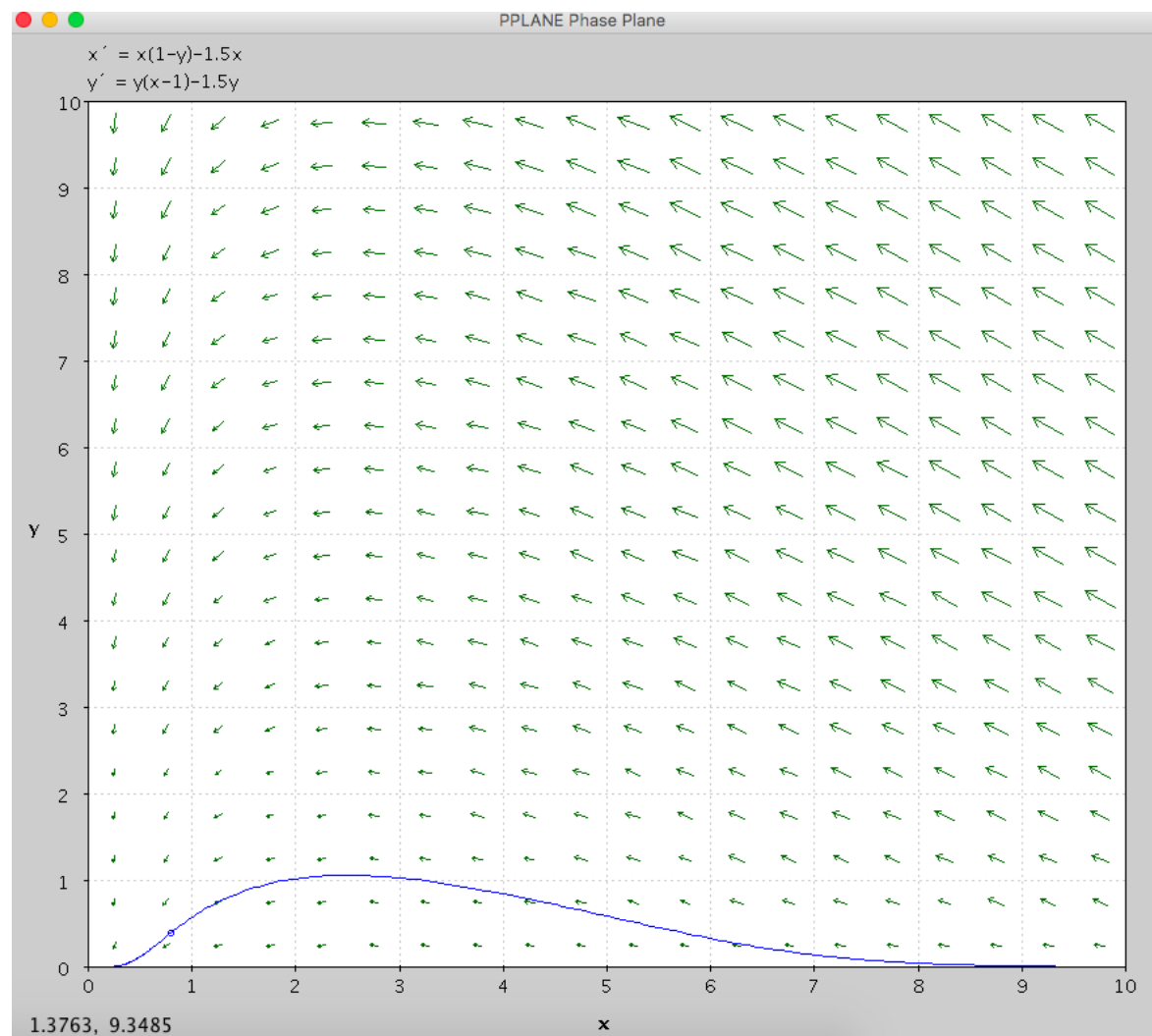




From the

plot above we could see it would work for $s=0$ and $s=0.5$

4



As you can see on the graph, both bugs will be eradicated