Additional homework due Friday 10/12/2018.

(On a separate piece of paper)

1. For each system below find horizontal and vertical nullclines, use nullclines to sketch direction field, and draw several trajectories.

a) $\begin{cases} dx/dt = x - y, \\ dy/dt = x - 3y. \end{cases}$

b) $\begin{cases} dx/dt = x + y \\ dy/dt = x - y. \end{cases}$

Note: You can check your direction field by entering your system into HPG System solver.

2. Consider the differential equation

$$y'' + 4y' + 3y = 0$$

a) Find two different solutions of this differential equation in the form $y(t) = e^{st}$.

b) Convert the differential equation into a system in (y, v) variables.

c) Draw the direction field for the system in b)

d) Find two different straight-line solutions of the system and draw them on (y, v) plane.