HW 3
Due Feb 20

This problem concerns the first predator-prey model in "Steady-state analysis of structured population models," by O. Diekmann, M. Gyllenberg, and J. A. J. Metz. The equations are (1.2) and (1.3), where $\nu = h = \gamma = \alpha = 1$ and $\mu = \beta = 2$. You get to pick the initial values for S and P, the only requirement is that they satisfy $0 < S(0) < 3$ and $0 < P(0) < 3$. The same values are to be used throughout this assignment.

The objective of this problem is to use MATLAB to investigate what happens to the solution as λ varies, from $\lambda = 0$ up to $\lambda = 10$. You should find that there is a λ interval where the solution approaches a steady state. Said another way, for any value of λ from this interval, the solution of the predator-prey model approaches a steady state. Find this interval approximately, and describe how the steady state changes as λ varies in this interval. Also, describe what the solution converges to for other values of λ from the interval $0 \leq \lambda \leq 10$.

You are to turn in your answer using a poster, one that is in the neighborhood of 36x48 inches in size. Various PowerPoint templates you can use for this are on our class web page (at the bottom), but you can make up your own. The poster should contain (at a minimum):

- the equations, with the variables clearly defined and the parameter values given,
- a statement or two explaining the objectives of this exercise ,
- several plots, which support your conclusions, and text explaining what each plot shows,
- a conclusion, and
- a reference for the paper.

Remember, an effective poster:

- Never uses a font size less than 24 pt.
- Lets graphs and images tell the story; uses text sparingly.
- Keeps the sequence well-ordered and obvious.

Also, the printer you will be using is vcplt (it is actually a plotter), and the info page on it is at http://helpdesk.rpi.edu/update.do?catcenterkey=78

For the equations in the PowerPoint poster shown in class, I used a program called LaTeXiT. This uses LaTeX commands to generate equations that can be copied and pasted into PowerPoint. Unfortunately, it only works on the Mac. If you use Windows, and LaTeX, there are similar sounding products. Examples are: TexPoint and TeX4PPT.