92.236 Engineering Differential Equations
Homework Problems on Slope Fields

1. You will need Dr. Polking's m-file dfield8.m. To download this file, go to our course web page: `http://faculty.uml.edu/spennell/Teaching/EngineeringDE/s15_92236.htm` Click on *Class handouts etc.* under **Course Materials** and scroll down to the MATLAB Handouts section, item 4. Right-click "dfield8.m" click on "Save Target As" (or Save Link As depending on which browser you use) and save the file. Take note of where you saved the file.

2. If you don't have your textbook with you, you should look at the homework assignment for this section, also under item 4 in the MATLAB Handouts section of the *Class handouts etc.* page.

3. Start MATLAB and change directories to the directory where you saved dfield8.m. To change directories, click on the toolbar icon that looks like a file folder with a green arrow coming out of it.

4. In the MATLAB command window, type the command dfield8

5. In the Dfield8 Setup box, enter the differential equation $y' = -y - \sin(x)$, indicate that the independent variable is $x$, and enter the window size (minimum $x$ and $y$ values are both $-3$; maximum $x$ and $y$ values are 3).

6. Click on the *Proceed* button in the bottom right of the Dfield8 Setup box.

7. In the Dfield8 Display box, generate solution curves through the points $(-2.5, 2), (-1.5, 2), (-0.5, 2), (0.5, 2), (1.5, 2), (2.5, 2), (-2.5, 1), (-2, -2), (-1, -2), (0, -2), (1, -2), (2, -2)$. You can generate these solution curves either by clicking on the points in the Dfield8 Display window or by clicking on *Options* on the toolbar, then clicking *Keyboard input*, then typing in the coordinates of each point and clicking *Compute*.

8. Click on *Edit* on the toolbar, then click on *Copy Figure*. Open a Word document and paste in the figure you just copied.

9. Go back to the Dfield8 Setup box, change the differential equation to $y' = x + y$, then click on the *Proceed* button. Generate solution curves through the points indicated in problem 2, section 1.3, of Edwards and Penney.

10. Copy and paste the new figure to your Word document.

11. Repeat the previous two steps to generate slope field and solution curves for the differential equation in problem 7. Please make sure you generate solution curves through the indicated points.

12. Please email the Word document to me at `stephen_pennell@uml.edu`.