Math 20750
Spring, 2016

Assignment 10, due Thursday, March 24

Note the unusual due date.

Reread §§8.5 and 9.1 and read §§9.1–2 in Polking, Boggess and Arnold.

Do:
§8.5 #28,33
§9.1 #16,24,53,54,56
§9.2 #42,44,46,50,52,54,57,59 if we get far enough Wednesday

Additional problem 1

Use **ode45** to find and plot a numerical approximation of the orbit (the path of the particle in the xy plane) in §8.5 #33 with $k = 1$ and $x(0) = 2, x'(0) = 0, y(0) = 0, y'(0) = -0.5$. (§14.3.3 in *Differential Equations with MATLAB®* explains how to use **ode45** for systems.)

Additional Problem 2

Let

$$\mathbf{x}(t) = \begin{pmatrix} e^t \\ te^t \end{pmatrix} \qquad \text{and} \qquad \mathbf{y}(t) = \begin{pmatrix} 1 \\ t \end{pmatrix}$$

(a) Show that $\mathbf{x}(t)$ and $\mathbf{y}(t)$ are linearly dependent at each point in the interval $0 \le t \le 1$.

(b) Show that $\mathbf{x}(t)$ and $\mathbf{y}(t)$ are linearly independent as vector valued functions.

(c) Why doesn't this contradict Proposition 8.5.12?

Reread chapters 14 and 15 in *Differential Equations with MATLAB®*.

Do as a MATLAB group:
Problem Set F #1 Do not use **pplane**.

Make sure the names of all members of your MATLAB group are on MATLAB assignment before turning it in.

Hint for Problem Set F #1

In (b), be sure to draw the eigenvectors if relevant and indicate the direction of increasing time on the trajectories.