

Math 23 Diff Eq: Homework 6

due Wed Nov 7 ... but best if do relevant questions after each lecture

Shorter one to recover from midterm!

Hint: In one of these you are to plot the ‘phase portrait’ (motion in x_1 - x_2 plane). This is easiest done with the Matlab tool `pplane7` or its online applet version; both are linked to from the course website. If you want to study $\mathbf{x}' = A\mathbf{x}$ with

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \quad (1)$$

then, since in `pplane7` the variables are called x and y , this can be achieved by entering $x' = a*x + b*y$ and $y' = c*x + d*y$.

7.1: 2 (easy),

7 (rather than sketch in the x_1, x_2 plane, use `pplane7` as described above).

7.2: 2,

9,

13,

14.

7.3: 4 (note this is similar to how you find eigenvectors once you have found a $\lambda =$ eigenvalue),

6,

15,

16 (interesting that a real matrix can have complex eigenvalues and vectors; note the conjugate pairing),

22 (easiest to use cofactor formula for $\det(A - \lambda I)$).