

Homework 5 – Due November 26

- * 5.2.4, 5.2.5, 5.2.6, 5.2.7, 5.2.8 (the same problems as last time, but this time follow the book's instructions: use Tr and Det to classify the fixed point, and sketch the phase portrait.)
- * 5.2.11
- * Solve each of the three dimensional systems $\dot{\mathbf{x}} = A\mathbf{x}$, where the matrix A is

$$\begin{bmatrix} 0 & 3 & 1 \\ 4 & 1 & -1 \\ 2 & 7 & -5 \end{bmatrix} \quad \text{or} \quad \begin{bmatrix} 1 & 0 & 2 \\ 0 & -1 & -2 \\ 2 & -2 & 0 \end{bmatrix}.$$

In each case find the general solution (in real form, i.e., the answer should contain no complex numbers), and also find the particular solution having

$$\mathbf{x}(0) = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}.$$

(Hint: if you don't make numerical mistakes, the eigenvalues should come out fairly nicely.)