Office Hour Help: M & W 2:30–4:00, Tu 2:00–3:30, & F 1:30–2:30 or by appointment. Website: `http://math.hws.edu/~mitchell/Math204S16/index.php`.

Reading and Practice

1. (*a*) Review Section 5.1 on Eigenvectors. Read ahead into Section 5.2 on the Characteristic Equation.

(*b*) Practice in Section 5.1, page 271ff #1–21 odd. Then do #23 using Theorem 5.2.

(*c*) Review. Key Terms from Section 4.9: probability vector, stochastic matrix, Markov chain, state vector, steady-state (equilibrium) vector, regular matrix. Key results: Theorem 4.18 (Regular Matrices and Steady State Vectors).

(*d*) New. Key Terms and Results from Section 5.1: eigenvalue, eigenvector, eigenspace, algebraic multiplicity, geometric multiplicity, Theorem 5.2.

Hand In

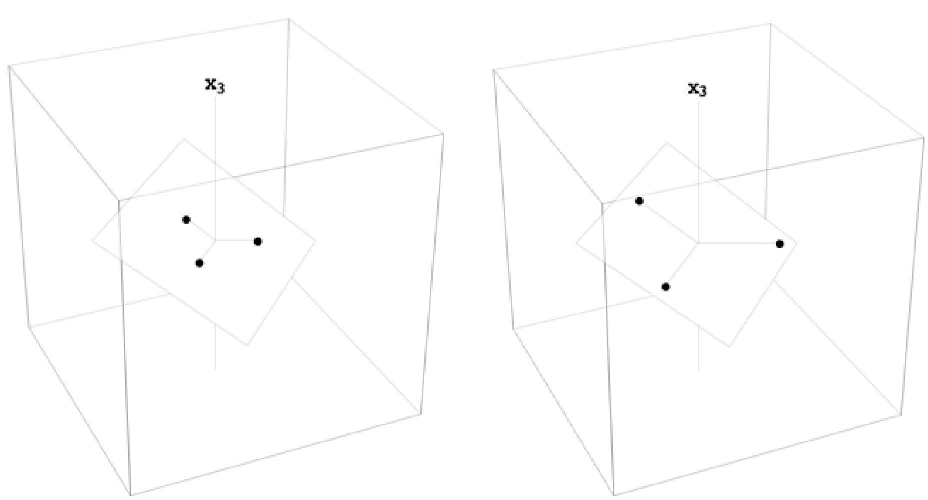
Remember the `Maple` assignment due Friday.

WeBWorK

You may wish to start WeBWorK set SHW13. Due Monday night. We will not have covered all the questions yet, but will have by Friday's class.

In Class Example

We will see that $\begin{bmatrix} 2 & 0 & 0 \\ -1 & 3 & 1 \\ -1 & 1 & 3 \end{bmatrix}$ has two eigenvalues: $\lambda = 2, 4$. The eigenspace $\mathbb{E}_2$ has basis $\left\{ \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} \right\}$. Under the transformation $\mathbf{x} \to A\mathbf{x}$, all the vectors in the plane spanned by $\mathbb{E}_2$ are simply scalar multiplied by 2.



Effects of Multiplying Vectors in Eigenspaces for $\lambda = 2$ by A

☞ OVER

Quick Examples

1. If $A = \begin{bmatrix} 0 & -2 \\ 12 & 10 \end{bmatrix}$, is $\mathbf{v} = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$ an eigenvector of A?

2. Assume that $\mathbf{v}_1 = \begin{bmatrix} -3 \\ 2 \end{bmatrix}$ and $\mathbf{v}_2 = \begin{bmatrix} -5 \\ 3 \end{bmatrix}$ are eigenvectors of the matrix $A = \begin{bmatrix} -31 & 18 \\ -45 & 26 \end{bmatrix}$. What are the corresponding eigenvectors?

3. What are the eigenvalues of $A = \begin{bmatrix} 4 & 3 & 1 \\ 0 & -2 & 8 \\ 0 & 0 & 6 \end{bmatrix}$?