Math 54: Quiz #6

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Please give neat and organized answers. Whenever applicable (especially for computational questions), make it clear what strategy you are using.

Problem 1

Let

$$A = \begin{pmatrix} 3 & 0 & 1 \\ 0 & 3 & 0 \\ 1 & 0 & 3 \end{pmatrix}.$$

Diagonalize A (making it clear what it means to diagonalize A and how you have done so). Check that eigenvectors of A with distinct eigenvalues are orthogonal.

Problem 2

Let

$$A = \begin{pmatrix} 3 & 1 \\ 1 & 2 \end{pmatrix}.$$

And consider the basis

$$\mathcal{B} = \left\{ \begin{pmatrix} 0 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \end{pmatrix} \right\}$$

of $\mathbb{R}^2$. (Note that the ordering of the basis matters!) Compute the matrix of A relative to the basis $\mathcal{B}$, i.e., $[A]_{\mathcal{B},\mathcal{B}}$.