

MATH 54, FALL 2016, QUIZ 8

- (1) Suppose A is a square matrix such that $\text{Null}(A-2I) = \text{span}\{\mathbf{v}_1, \mathbf{v}_2\}$ and $\text{Null}(A+I) = \text{span}\{\mathbf{v}_3\}$.

$$\mathbf{v}_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \mathbf{v}_2 = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}, \mathbf{v}_3 = \begin{bmatrix} -2 \\ 1 \\ 3 \end{bmatrix},$$

- (a) Find A .

- (b) Let $\mathbf{w} = \mathbf{v}_1 - \mathbf{v}_2 + 3\mathbf{v}_3$. What is $A^5\mathbf{w}$?

- (2) Find a diagonal matrix D and an invertible matrix P , both with entries in \mathbb{C} , such that $B = PDP^{-1}$.

$$B = \begin{bmatrix} -1 & -2 \\ 2 & -1 \end{bmatrix}$$