

Quiz 5.

- (1) Let V be a vector space over $\mathbb{C}$ and take $A \in L(V, V)$. State what it means for a vector v to be an eigenvector of A .

Answer: v is an eigenvector associated with eigenvalue λ if.

$$Av = \lambda v, \quad v \neq 0.$$

- (2) Let V be a vector space over $\mathbb{C}$, take $A \in L(V, V)$ with eigenvalues $5, -1$. What are the eigenvalues of $B = A - 7I$?

Answer: Let v_1 be an eigenvector ~~of A~~ associated with 5 of A .

Let v_2 be an eigenvector associated with -1 of A .

$$Av_1 = 5v_1$$

$$Av_2 = -v_2$$

$$Av_1 - 7v_1 = 5v_1 - 7v_1$$

$$Av_2 - 7v_2 = -v_2 - 7v_2$$

$$(A - 7I)v_1 = -2v_1$$

$$(A - 7I)v_2 = -8v_2$$

$$Bv_1 = -2v_1$$

$$Bv_2 = -8v_2$$

$\boxed{-2}, \boxed{-8}$ are eigenvalues of B .

subtract
 $7v_i$ on each
side.