Name: Key ID #:

As always you need to show your work. Fill in the appropriate blanks

1. A pair (λ, v) is an eigen pair if $\boxed{Av = \lambda v}$ and $\boxed{v \neq 0}$

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

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

2.1. Is $v = \{1, 1, -1\}$ an evec of A? $\boxed{\text{yes}}$ if it is compute the eval $\lambda = \boxed{2}$

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

$$\begin{bmatrix} 2 & 1 & 1 \\ 2 & 1 & 1 \\ -2 & 1 & 1 \end{bmatrix}\begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix} = \begin{bmatrix} 0+1-1 \\ 0+1-1 \\ 0+1-1 \end{bmatrix} = 0\begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix}$$

3.1. Is $v = \{0, 1, -1\}$ an an evec of A? $\boxed{\text{yes}}$ if it is compute the eval $\lambda = \boxed{0}$

4. For $A = \begin{pmatrix} 4 & 2 \\ -2 & 5 \end{pmatrix}$.

$[A-8I] = \begin{bmatrix} -4 & 2 \\ -2 & -3 \end{bmatrix} \sim \begin{bmatrix} 2 & 1 \\ -2 & -3 \end{bmatrix} \sim \begin{bmatrix} 2 & 1 \\ 0 & -2 \end{bmatrix}$ no free vars.

4.1. Is $\lambda = 8$ an eval of A? NO if it is compute the evec $v =$ ///

5. For $A = \begin{pmatrix} 4 & 2 \\ -2 & 5 \end{pmatrix}$.

$A - 5I = \begin{pmatrix} -1 & 2 \\ -2 & 0 \end{pmatrix} \sim \begin{pmatrix} 1 & -2 \\ 0 & -4 \end{pmatrix}$ no free vrs

5.1. Is $\lambda = 5$ an eval of A? NO if it is compute the evec $v =$ ///