Linear Algebra Final Exam 2024

Credits to : HITSZCS GitHub repository

Problem I

$$Let(A) = \begin{bmatrix} 1 & -3 \\ -4 & 2 \end{bmatrix}$$

1)Suppose a non-zero vector x is an eigenvector of A associated with the eigen-value λ . Prove that x is also eigenvector of A^2.

2)Find the eigenvalues and eigenvectors of A.

Probelm II

$$A = \begin{bmatrix} 1 & 4 & 7 \\ 2 & 3 & 9 \\ 1 & 1 & 4 \end{bmatrix}$$

1)Compute the $det(A)$

2)Denote C such as $AC^T = (detA)I$. With $det(A)$ in 1, find $det(C)$

Problem III

$$A = \begin{bmatrix} 1 & -1 & -2 & 3 \\ 2 & 1 & -4 & 0 \\ 1 & 2 & -2 & -3 \end{bmatrix} \text{ for } Ax = b \rightarrow \left[\begin{array}{cccc|c} 1 & -1 & -2 & 3 & 1 \\ 2 & 1 & -4 & 0 & 5 \\ 1 & 2 & -2 & -3 & c \end{array}\right]$$

1)Use row reduction to find the value of c such that the system $Ax = b$ is consistent.

2)Determine which variables are free variables for the system $Ax = 0$.

There were 4 problems, the fourth one was a simple matrix multiplication,(Mutliply a 3 by 3 matrix…)

Join us for more at : https://github.com/elalamiimed/HITSZCS

Please leave a star, contribute, and join our wechat groupchat!

Good luck !

@elalamiimed…