LINEAR ALGEBRA

11.04.2019

1. Consider the following matrix

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

a) Find the eigenvalues of A. (20 pts).
b) Find the eigenvectors corresponding to each eigenvalue. (20 pts).
c) Show whether the eigenvectors are linearly independent. (10 pts).
d) Find the eigenvalues of the matrix $I - A$. (10 pts).
e) Find the inverse of A. (10 pts).
f) Find the eigenvalues of the matrix A^{-1}. (10 pts).
g) Find the rank of A and the null space of A. (10 pts).
h) Let $b = [1, 2, 3]^T$ and $x = [x_1, x_2, x_3]^T$. Find the solution of $Ax = b$ by using the Cramer's rule. (10 pts).

Duration : 75 Minutes