Home Assignment

Q.1 Let $L: P_2 \longrightarrow P_3$ be the L.T defined by

$$L(p(t)) = t^2 p'(t)$$

$$L[u_1, u_2, u_3, u_4] = [u_1+u_2, u_3+u_4, u_1+u_3]$$

(a) Find a basis for $\ker(L)$?

(b) Find a basis for range(L) ?

(c) Find dim (ker(L)); dim (range(L)) ?

Q.2 Can $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$ be diagonalized ?

Q.3 Find non singular matrix P s.t $P^{-1}AP$ is diagonal.

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 0 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$$

Q.4 Find a basis & the dimension of solution space of homogeneous system

$$\begin{bmatrix} 1 & 2 & 2 & -1 & 1 \\ 0 & 2 & 2 & -2 & -1 \\ 2 & 6 & 2 & -4 & 1 \\ 1 & 4 & 0 & -3 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$