

Deadline Monday 04-12-22

Question 1: Let $S = \{p_1(t), p_2(t), p_3(t)\}$ and $T = \{q_1(t), q_2(t), q_3(t)\}$ where

$$p_1(t) = -3t^2 + 3; p_2(t) = -3t^2 + 2t - 1; p_3(t) = t^2 + 6t - 1; q_1(t) = -6t^2 - 6t; q_2(t) = -2t^2 - 6t + 4; q_3(t) = -2t^2 - 3t + 7$$

be ordered bases for P_3 . Let $p(t) = v = -5t^2 + 8t - 5$.

- (1) Find the transition matrix from the S basis to the T basis.
- (2) Find the coordinate vectors of v with respect to the basis S directly.
- (3) Find the coordinate vectors of v with respect to T using transition matrix computed in part (1).

Question 2:- (a) Find orthonormal basis for the subspace W of vector space R^4

consisting of all vectors of the form
$$\begin{bmatrix} a - b \\ b - c \\ c - a \\ b \end{bmatrix}$$

(b) write vector $v = \begin{bmatrix} 1 \\ 0 \\ 1 \\ 0 \end{bmatrix}$ as a linear combination of orthonormal basis obtained in part (a).