

Homework 14 MATH 304 Section 3

Assigned: Wednesday, October 22.

Potentially Collected: Wednesday, October 29.

1. Given a vector space V , a basis X , and a vector \vec{w} calculate $K_X(\vec{w})$.

(a) $V = \mathbb{R}^3$, $X = \left\{ \begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \right\}$, and $\vec{w} = \begin{bmatrix} -1 \\ 1 \\ 2 \end{bmatrix}$.

(b) $V = \mathbb{R}^4$, $X = \left\{ \begin{bmatrix} 0 \\ 0 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} -1 \\ 1 \\ 1 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 2 \\ 1 \\ 2 \\ 1 \end{bmatrix} \right\}$, and $\vec{w} = \begin{bmatrix} 2 \\ 0 \\ 0 \\ 2 \end{bmatrix}$.

(c) $V = \mathbb{P}_2$, $X = \{x^2 + 1, x + 1, x^2 + x\}$, and $\vec{w} = 3x^2 - x - 2$.

(d) $V = \mathbb{P}_3$, $X = \{x^3 + x^2 + x + 1, x^3 + 2x^2 + x + 3, 2x^3 + x^2 + 3x + 2, x^3 + x^2 + 2x + 2\}$, and $\vec{w} = x^3 - x$.