2022年9月25日 星期日 14:51

Homework 1: let $V = \{(x, y) \mid y = k_0 x + k_1 x^2 + k_2 x^3,\ k_0, k_1, k_2 \in R,\ x, y \in R\}$

$V_1 + V_2 = (x_1 + x_2,\ y_1 + y_2)$

$y_1 + y_2 = k_0 x_1 + k_1 x_1^2 + k_2 x_1^3 + k_0 x_2 + k_1 x_2^2 + k_2 x_2^3$

$= k_0(x_1 + x_2) + k_1(x_1^2 + x_2^2) + k_2(x_1^3 + x_2^3)$ ①

if V is a subspace of R^2,

$y_1 + y_2 = k_0(x_1 + x_2) + k_1(x_1 + x_2)^2 + k_2(x_1 + x_2)^3$ ②

but ① is not identically equal to ②.

So the V is not a subspace of R^2.

Homework 2:

answer: let $W_1 = a_1 V_1 + b_1 V_2$ $W_2 = a_2 V_1 + b_2 V_2$, $W_1, W_2 \in W$

$W_1 + W_2 = \underbrace{(a_1 + a_2)}_{\in R} V_1 + \underbrace{(b_1 + b_2)}_{\in R} V_2 \in W$

$\alpha W_1 = \underbrace{\alpha a_1}_{\in R} V_1 + \underbrace{\alpha b_1}_{\in R} V_2 \in W$ $(k \in F)$

Thus, W is a subspace of R^2

Homework 3:

answer: let $B_1 \in W_2$, $B_1 \in R^{n \times n}$, $\det(B_1) \neq 0$

$\because \det(B_1) \neq 0 \Rightarrow B_1 \neq 0$

$\therefore W_2$ is not a subspace of $R^{n \times n}$.