第三次作业

葛旭

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1.

$$\omega_1 = \omega_2 = 0, \text{so } \vec{0} \text{ vector is in } \begin{bmatrix} \omega_1 \\ \omega_2 \end{bmatrix}$$

$$\text{addition}: \begin{bmatrix} \omega_1 \\ \omega_2 \end{bmatrix} + \begin{bmatrix} \omega_3 \\ \omega_4 \end{bmatrix} = \begin{bmatrix} \omega_1 + \omega_3 \\ \omega_2 + \omega_4 \end{bmatrix}$$

$$\omega_1^2 = \omega_2^2, \omega_3^2 = \omega_4^2$$

$$\frac{\omega_1}{\omega_2} = \pm 1, \frac{\omega_3}{\omega_4} = \pm 1(\text{except for } \vec{0} \text{ vector})$$

$$\text{so } \frac{\omega_1}{\omega_2} \text{ may not be equal to } \frac{\omega_4}{\omega_3}$$

$$\Rightarrow \omega_1\omega_3 \text{ may not be equal to } \omega_2\omega_4$$

$$\Rightarrow (\omega_1 + \omega_3)^2 \text{may not be equal to} (\omega_2 + \omega_4)^2$$

$$\Rightarrow \text{so S is not closed under vector addition}$$

$$\text{S is not a subspace of R}^2$$

2.

define $f : R \to R, f(x) \equiv 0,$

so $f(t) = f(-t) = 0,$ so $\vec{0}$ vector is in X

addition:$(f_1 + f_2)$(t) $= f_1(t) + f_2(t) = f_1(-t) + f_2(-t) = (f_1 + f_2)(-$ t)

so f is closed under addition.

scalar multiplication:(kf)(t) $= kf(t) = kf(-t) = (kf)(-t)$

so f is closed ubder scalar multiplication.

so X is a subspace of real - valued functions.