第二次作业

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1.

$$
\begin{aligned}
&\omega_1 = \omega_2 = 0, \text{so } \vec{0} \text{ vector is in } \begin{bmatrix} \omega_1 \\ \omega_2 \end{bmatrix} \\
&\text{addition : } \begin{bmatrix} \omega_1 \\ \omega_2 \end{bmatrix} + \begin{bmatrix} \omega_3 \\ \omega_4 \end{bmatrix} = \begin{bmatrix} \omega_1 + \omega_3 \\ \omega_2 + \omega_4 \end{bmatrix} \\
&\omega_1^2 = \omega_2^2, \omega_3^2 = \omega_4^2 \\
&\frac{\omega_1}{\omega_2} = \pm 1, \frac{\omega_3}{\omega_4} = \pm 1 (\text{except for } \vec{0} \text{ vector}) \\
&\text{so } \frac{\omega_1}{\omega_2} \text{ may not be equal to } \frac{\omega_4}{\omega_3} \\
&\Rightarrow \omega_1\omega_3 \text{ may not be equal to } \omega_2\omega_4 \\
&\Rightarrow (\omega_1 + \omega_3)^2 \text{may not be equal to} (\omega_2 + \omega_4)^2 \\
&\Rightarrow \text{so S is not closed under vector addition} \\
&\text{S is not a subspace of R}^2
\end{aligned}
$$

2.

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

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

addition:$(f_1 + f_2)(\mathrm{t}) = f_1(t) + f_2(t) = f_1(-t) + f_2(-t) = (f_1 + f_2)(-\mathrm{t})$

so f is closed under addition.

scalar multiplication:$(kf)(\mathrm{t}) = kf(t) = kf(-t) = (kf)(-t)$

so f is closed ubder scalar multiplication.

so X is a subspace of real - valued functions.