第四次作业

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2020 年 4 月 24 日

1.(1)$3a_1 + a_2 = a_3$

so a_1, a_2, a_3 is linearly dependent.

(2)suppose $k_1p_1(x) + k_2p_2(x) + k_3p_3(x) = 0$,

so $k_1 + 5k_2 + k_3 = 0$

$-k_1 + 3k_2 + 3k_3 = 0$

$-2k_2 + -2k_3 = 0$

figure out that $k_1 = 0, k_2 = 0, k_3 = 0$

so $p_1(x), p_2(x), p_3(x)$ is linearly independent

2.

$L(x_1 + x_2, \cdots, x_n + x_1) = k_1(x_1 + x_2) + \cdots + k_n(x_n + x_1)$

$= (k_1 + k_n)x_1 + (k_1 + k_2)x_2 + \cdots + (k_{n-1} + k_n)x_n$

$x_1, x_2, \cdots, x_n$ is linearly independent,and n is an odd number,so

$$\begin{cases} k_1 + k_n = 0 \\ k_1 + k_2 = 0 \\ \cdots\cdots\cdots \\ k_{n-1} + k_n = 0 \end{cases} \Rightarrow \begin{cases} k_1 = 0 \\ k_2 = 0 \\ \cdots\cdots \\ k_n = 0 \end{cases}$$

so $x_1 + x_2, \cdots\cdots, x_n + x_1$ is linearly independent,too.