

## 微積分演習第8回

Litt-問題

$$x'' = -x$$

法則に従うとる。初期条件  $x(0) = C_1$   
 $x'(0) = C_2$

$x(d_1 + d_2 + d_3 + d_4)$ ,  $x(d_1 + \dots + d_5)$  を計算せよ。

$x(d_1 + d_2 + d_3 + d_4)$  を計算する。

$$\begin{aligned} & x(d_1 + d_2 + d_3 + d_4) \\ &= x(d_1 + d_2 + d_3) + x'(d_1 + d_2 + d_3) d_4 \end{aligned}$$

$$\begin{aligned} &= C_1(1 - d_1 d_2 - d_1 d_3 - d_2 d_3) + C_2(d_1 + d_2 + d_3 - d_1 d_2 d_3) \\ &\quad + \{ x'(d_1 + d_2) + \underbrace{x''(d_1 + d_2)}_{-x} d_3 \} d_4 \end{aligned}$$

$$= C_1(1 - d_1 d_2 - d_1 d_3 - d_2 d_3) + C_2(d_1 + d_2 + d_3 - d_1 d_2 d_3)$$

$$+ \{ x'(d_1) + \underbrace{x''(d_1)}_{-x} d_2 - (x(d_1) + x'(d_1) d_2) d_3 \} d_4$$

$$= C_1(1 - d_1 d_2 - d_1 d_3 - d_2 d_3) + C_2(d_1 + d_2 + d_3 - d_1 d_2 d_3)$$

$$+ [C_2 - C_1 d_1 - (C_1 + C_2 d_1) d_2 - \{C_1 + C_2 d_1 + (C_2 - C_1 d_1) d_2\} d_3] d_4$$

$$= C_1(1 - d_1 d_2 - d_1 d_3 - d_2 d_3 - d_1 d_4 - d_2 d_4 - d_3 d_4 + d_1 d_2 d_3 d_4)$$

$$+ C_2(d_1 + d_2 + d_3 + d_4 - d_1 d_2 d_3 - d_1 d_2 d_4 - d_1 d_3 d_4 - d_2 d_3 d_4)$$

$$\boxed{x'' = -x} \quad \text{法則}$$

$$\hookrightarrow \text{微分} \quad x''' = -x'$$

$$\text{よって、} (x')'' = -(x')$$

L2がL2.

$x'$  は "法則" をみたL2である。

$$x' \text{ の初期条件は } x'(0) = C_2$$

$$x''(0) = -x(0) = -C_1$$

$$\text{よって、} x(d_1 + d_2 + d_3 + d_4)$$

$$= x(d_1 + d_2 + d_3) + \underline{x'(d_1 + d_2 + d_3)} d_4$$

$$= C_1(1 - d_1 d_2 - d_1 d_3 - d_2 d_3) + C_2(d_1 + d_2 + d_3 - d_1 d_2 d_3)$$

$$+ \{ \underline{C_2(1 - d_1 d_2 - d_1 d_3 - d_2 d_3) - C_1(d_1 + d_2 + d_3 - d_1 d_2 d_3)} \} d_4$$

$$= C_1(1 - d_1 d_2 - d_1 d_3 - d_2 d_3 - d_1 d_4 - d_2 d_4 - d_3 d_4 + d_1 d_2 d_3 d_4)$$

$$+ C_2(d_1 + d_2 + d_3 + d_4 - d_1 d_2 d_3 - d_1 d_2 d_4 - d_1 d_3 d_4 - d_2 d_3 d_4)$$