

階乗関数とその差分

階乗関数

$$x^{(n)} = \underbrace{x(x-1)(x-2)\cdots(x-(n-1))}_{n\text{個}}$$

例) $7^{(4)} = 7 \times 6 \times 5 \times 4 = 840$

$$3^{(3)} = 3 \times 2 \times 1 = 6$$

$$\begin{aligned}\Delta x^{(n)} &= \{(x+1)x\cdots(x-(n-2))\} - \{x(x-1)\cdots(x-(n-1))\} \\ &= [(x+1) - (x-(n-1))]x(x-1)\cdots(x-(n-2)) \\ &= nx^{(n-1)}\end{aligned}$$

$$\Delta x^{(n)} = nx^{(n-1)}$$

$$[x^n]' = nx^{n-1}$$

