Wednesday, September 27, 2023 10:00 AM

$a = 10 \qquad \Delta a = 1$

2.2.

$\Delta f(a) = ?$ $\qquad f(a) = a^2$

a^2 — a) $f(a) = a^2$; b) $a \cdot a$

a) $K_{\Delta a}(a) = [9, 11]$

$f'(a) = 2a$ → мон. рас.

$M_1 = 22 = f'(11)$

$\Delta f(a) = M_1 \cdot \Delta a = 22$

b) $\Delta_{a \cdot a} = 2|a| \Delta a$

$= 2 \cdot 10 \cdot 1 = 20$

c) $f(10) = 10^2 = 100$

a) $\Delta f(a) = 22 \quad \Delta a$ $\qquad a = 10 \in [9, 11]$

$a \in [9, 11] \; f(a) \longrightarrow f(a) \in [100 - 22, 100 + 22]$

$[78, 122]$

b) $\Delta_{a \cdot a} = 20$

$f(a) \in [100 - 20, 100 + 20]$

$[80, 120]$

$f(9) = 9^2 = 81$

$f(11) = 11^2 = 121$

$f(a) \in [81, 121]$

$[81, 121] \in [78, 122]$ a

$[81, 121] \in [80, 120]$ b

$\Delta a \cdot a = 20 \rightarrow$ nem helyes
mert Δa nem
elhanyag. pici

2.3. $a \cdot a \in [10000 - 400, 10000 + 400]$

$$\sqrt{a \cdot a + b \cdot b} = \sqrt{c} \quad c = 50000$$

$$\Delta c = 1600$$

$$f(c) = \sqrt{c}$$

$$f'(c) = (c^{\frac{1}{2}})' = \frac{1}{2} c^{-\frac{1}{2}} = \frac{1}{2} \frac{1}{\sqrt{c}}$$

mon. $\searrow$

$$M_1 = \max |f'(c)| = f'(48400)$$

$$= \frac{1}{2} \cdot \frac{1}{\sqrt{48400}} = \frac{1}{2} \cdot \frac{1}{220}$$

$$= \frac{1}{440}$$

$$\Delta f(c) = \Delta_{\sqrt{a \cdot a + b \cdot b}} =$$

$$= M_1 \cdot \Delta_c = \frac{1}{440} \cdot 1600$$

$$= \frac{40}{11} \approx 3.64$$

$$\sqrt{a \cdot a + b \cdot b} \in [\sqrt{50000} - 3.64, \sqrt{50000} + 3.64]$$

3.1. $\begin{cases} a x_1 + b x_2 = c \\ d x_1 + e x_2 = f \end{cases}$

$$\begin{pmatrix} a & b \\ d & e \end{pmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} c \\ f \end{bmatrix}$$

$$\underbrace{}_{A}\ \underbrace{}_{x}\ \underbrace{}_{b}$$

$$Ax = b$$

$$A = \begin{bmatrix} 1 & 2 & -1 \\ 2 & -1 & 3 \\ -1 & 3 & 1 \end{bmatrix} \qquad b = \begin{bmatrix} 4 \\ 3 \\ 6 \end{bmatrix}$$

$$\left[\begin{array}{ccc|c} \boxed{1} & 2 & -1 & 4 \\ 2 & -1 & 3 & 3 \\ -1 & 3 & 1 & 6 \end{array}\right] \quad \cdot(-2)\ + \qquad \cdot 1\ +$$

$$\left[\begin{array}{ccc|c} 1 & 2 & -1 & 4 \\ 0 & -5 & 5 & -5 \\ 0 & 5 & 0 & 10 \end{array}\right] \quad \cdot 1\ +$$

$$\left[\begin{array}{ccc|c} 1 & 2 & -1 & 4 \\ 0 & -5 & 5 & -5 \\ 0 & 0 & 5 & 5 \end{array}\right]$$

$$\begin{cases} x_1 + 2 \cdot x_2 - x_3 = 4 \\ \quad -5x_2 + 5x_3 = -5 \\ \qquad\qquad 5x_3 = 5 \end{cases}$$

III $\quad x_3 = 1$

II $\quad -5x_2 + 5 \cdot 1 = -5$

$$-5x_2 = -10$$

$$x_2 = 2$$

$$1 \quad x_1 + 2 \cdot 2 - \ldots$$

$$x_1 = 1$$

b) $$\left[\begin{array}{ccc|c} 1 & 2 & -1 & 4 \\ 0 & -5 & 5 & -5 \\ 0 & 0 & 5 & 5 \end{array}\right] \cdot (-1) \quad \cdot \frac{1}{5}$$

$$\left(\begin{array}{c} J_3 \cdot x = b \\ \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix} \end{array} \right)$$

$$\left[\begin{array}{ccc|c} 1 & 2 & 0 & 5 \\ 0 & -5 & 0 & -10 \\ 0 & 0 & 5 & 5 \end{array}\right] \cdot \frac{2}{5}$$

$$(**) \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & -5 & 0 & -10 \\ 0 & 0 & 5 & 5 \end{array}\right] \begin{array}{l} \\ \cdot\left(-\frac{1}{5}\right) \\ \cdot\left(\frac{1}{5}\right) \end{array}$$

$$(***) \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 1 \end{array}\right] \begin{array}{l} \to x_1 = 1 \\ \to x_2 = 2 \\ \to x_3 = 1 \end{array}$$

$$J_3 \cdot X = \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$$

$$\left(\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{pmatrix} 1 \\ 2 \\ 1 \end{pmatrix} \right)$$

$$\left\{\begin{aligned} x_1 &= 1 \\ x_2 &= 2 \\ x_3 &= 1 \end{aligned}\right.$$

c) $\cdot(-1)\cdot(-1) = \cdot(-1)^2$

k sor.csere: $\cdot(-1)^k \det(A)$

$(\cancel{X})(a)$: $\det(A) = 1\cdot(-5)\cdot 5 = -25$

$(XX)(b) \to$

$(XXX)(b)$: $\det(A) = 1\cdot\left(1/\left(-\frac{1}{5}\right)\right)\cdot\left(1/\frac{1}{5}\right)$

$= 1\cdot(-5)\cdot 5 = -25$