Cours 27/10

jeudi 27 octobre 2022 17:34

## • Utilité Forme canoniq :

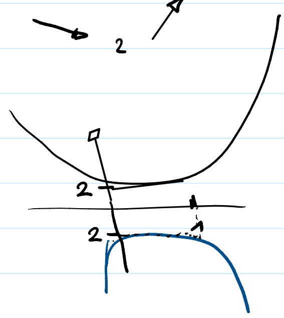
$$f(x) = ax^2 + bx + c = a\underline{(x-d)}^2 + e$$

$\cup$

$$2\underline{(x-1)}^2 + \underline{2}$$

$x = 1 \to 2(0) + 2 = 2$

| $x$ | | $1$ | |
|---|---|---|---|
| $f(x)$ | $\searrow$ | $2$ | $\nearrow$ |



$$-2(x-1)^2 - 2$$

$x = 1 \to -2$

$\cap$

$\nearrow -2 \searrow$

$$2(x-1)^2 - 2$$

$x = 1 \to -2$

$\cup$

$\searrow -2 \nearrow$

$$f(x) = (x-a)(x-b) = (x-c)^2 + d$$

| $x$ | $\min(a,b)$ | $c$ | $\max(a,b)$ |
|---|---|---|---|
| $f(x)$ | $\searrow 0$ | $\searrow d$ | $\nearrow 0 \nearrow$ |

## • DM :

$$\frac{\gamma c}{\gamma^2} = \frac{3\times\cancel{2}}{\cancel{2}}$$

$$\begin{array}{c} L_1 \\ L_2 \\ L_3 \end{array}\left(\begin{array}{ccc|c} 1 & -1 & 1 & -2 \\ 1 & 1 & 1 & 4 \\ 9 & 3 & 1 & 2 \end{array}\right) \Leftrightarrow \left(\begin{array}{ccc|c} 1 & 1 & 1 & 4 \\ 0 & -2 & 0 & -6 \\ 8 & 2 & 0 & -2 \end{array}\right) \begin{array}{l} L_1 \text{ pivot} \\ L_2 \leftarrow L_2 - L_1 \\ L_3 \leftarrow L_3 - L_1 \end{array} \Leftrightarrow \left(\begin{array}{ccc|c} 1 & 1 & 1 & 4 \\ 0 & 1 & 0 & 3 \\ 4 & 1 & & -1 \end{array}\right)$$

$$\Leftrightarrow \left(\begin{array}{ccc|c} 1 & 1 & 1 & 4 \\ 0 & 1 & 0 & 3 \\ 4 & 0 & 0 & -4 \end{array}\right) \begin{array}{l} L_2 \text{ pivot} \\ L_3 \leftarrow L_3 - L_2 \end{array}$$

$$\Leftrightarrow \left(\begin{array}{ccc|c} 1 & 1 & 1 & 4 \\ 0 & 1 & 0 & 3 \\ 1 & 0 & 0 & -1 \end{array}\right) \quad \begin{array}{l} c = 4 - 3 + 1 = 2 \\ b = 3 \\ a = -1 \end{array}$$

$x^2 = 1$
$x = \pm\sqrt{1}$
$S = \{-1 ; 1\}$

$\cos(x) = 1$
$x = \cos^{-1}(1)$

$e^x = 1$
$x = \ln(1)$

$10x = 1$
$x = \frac{1}{10}$

$x + 5 = 1$
$x = 1 - 5$

$$\begin{cases} M \in C_g \\ A \in C_g \end{cases} \Leftrightarrow \begin{cases} a x_M^2 + b x_M + c = 3 \\ a x_A^2 + b x_A + c = 1 \end{cases}$$

$a = 2b$

$(a, 2a)$

$$\Leftrightarrow \left(\begin{array}{ccc|c} 4 & 2 & 1 & 3 \\ 1 & 1 & 1 & 1 \end{array}\right)$$

$$\Leftrightarrow \left(\begin{array}{ccc|c} 3 & 1 & 0 & 2 \\ 1 & 1 & 1 & 1 \end{array}\right)$$

$a = \frac{2-b}{3}$

$c = 1 - b - \frac{2-b}{3}$

$S = \left(\frac{2-b}{3}, b, 1 - b - \frac{2-b}{3}\right) \quad b \in \mathbb{R}$

$\frac{d}{2} + 1 \qquad 5 - d \qquad 2 - \frac{d}{2}$

$0 \leq d \leq 9$

$0 \quad 2 \quad 4$

$$\begin{cases} 0 \leq \frac{d}{2} + 1 \leq 9 \\ 0 \leq 5 - d \leq 9 \\ 0 < 2 - \frac{d}{2} \leq 9 \end{cases} \Rightarrow d \text{ pair} \begin{cases} -2 \leq \frac{d}{2} \leq 16 \\ +5 \geq +d \geq -4 \\ +4 \geq d \geq -14 \end{cases} \Rightarrow 0 \leq d \leq 4$$

| | | | |
|---|---|---|---|
| 1 | 5 | 2 | 0 |
| 2 | 3 | 1 | 2 |
| 3 | 1 | 0 | 4 |

Pour $d$ dans $[0, 2, 4]$

code possible $[\;] = [\frac{d}{2} \ldots\ldots]$

## • Polynome 2nd degré :

**1.** $\frac{x^2}{3} - \frac{x+3}{4} = \frac{19}{3}$ **2.** $\frac{x-1}{9} - x^2 = 10x + 15$ **3.** $(x-1)(x^2 - 3x + 2) = 0$

1. $\frac{1}{3}x^2 - \frac{1}{4}x + \frac{3}{4} - \frac{19}{3} = 0$

$\Delta = \ldots$

$(x - x_1)(x - x_2) = 0$

$S = \{x_1, x_2\}$

2) $-x^2 + x\left(-10 + \frac{1}{9}\right) - 15 = 0$

$\Delta = \ldots$

$(x - x_1)(x - x_2) = 0$

$S = \{x_1, x_2\}$

3) $x - 1 = 0$ ou $x^2 - 3x + 2 = 0$

$x = 1$ ou $\Delta \ldots$

$(x - x_1)(x - x_2) = 0$

$S = \{x_1, x_2, 1\}$

**1.** $3x^2 - 5x + 2 < 0$ **2.** $4x^2 - 3x - 1 \geq 0$ **3.** $2x^2 - x + 8 > 0$

$\Delta = \ldots$

$S = ]x_1, x_2[$

ou

$\Delta = \ldots$

$S = ]-\infty ; x_1] \cup [x_2 ; +\infty[$

$\Delta = \ldots$

$S = ]-\infty ; x_1[ \cup ]x_2 ; +\infty[$

① Forme canoniq, delta ( $F(x) = 0$, Forme Factorisé) ① ; $F(x) = 4$ ; $F(4) = a4^2 + b4 + c$

$a(x-b)^2 +$ reste par ♡

$\Leftrightarrow ax^2 + bx + c = 4$

$\Leftrightarrow ax^2 + bx + c - 4 = 0$

$\Delta = \dots$

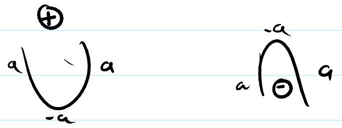
$S = \{ \dots \}$

$x^2 + bx + c$

$\left(x + \frac{b}{2}\right)^2 +$ reste

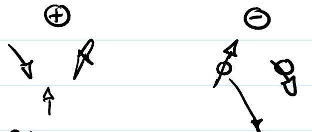
② Étude

Signe :




a -a a

Variation:




$f\left(-\frac{b}{2a}\right)$

grâce à canoniq

grâce à $\Delta$ et Forme Factorisée

$-1 \leq \cos(x) \leq 1$

$\Leftrightarrow \quad 0 \leq 1 + \cos(x) \leq 2$

$\Leftrightarrow \quad 0 \leq \dfrac{1 + \cos(x)}{2} \leq 1$