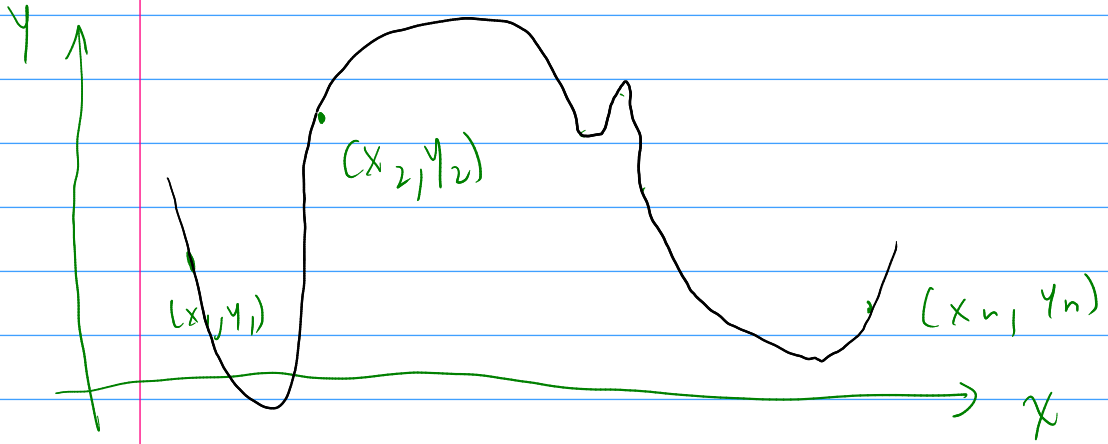
Interpolación de Lagrange.

$\{(x_1, y_1), (x_2, y_2), \cdots, (x_n, y_n)\}$



$$f(x) = l_1(x)\, y_1 + l_2(x)\, y_2 + \cdots + l_n(x)\, y_n$$

$$l_i(x) = \frac{(x-x_1)(x-x_2)\cdots(x-x_{i-1})(x-x_{i+1})\cdots(x-x_n)}{(x_i-x_1)(x_i-x_2)\cdots(x_i-x_{i-1})(x_i-x_{i+1})\cdots(x_i-x_n)}$$

$$l_i(x_1) = \frac{(x_1-x_1)}{} = 0$$

$$l_i(x_2) = (x_2-x_1)\frac{(x_2-x_2)}{} = 0$$

$$l_i(x_i) = 1$$

$$l_i(x_j) = \delta_{ij} = \begin{cases} 0 & i \neq j \\ 1 & i = j \end{cases}$$

$$f(x) = l_1(x)\, y_1 + l_2(x)\, y_2 + \cdots + l_n(x)\, y_n$$

$$f(x_i) = l_1(x_i)\, y_1 + l_2(x_i) y_2 + \cdots + l_i(x_i)\, y_i + \cdots$$

$$\| \qquad\qquad \| \qquad\qquad \|$$

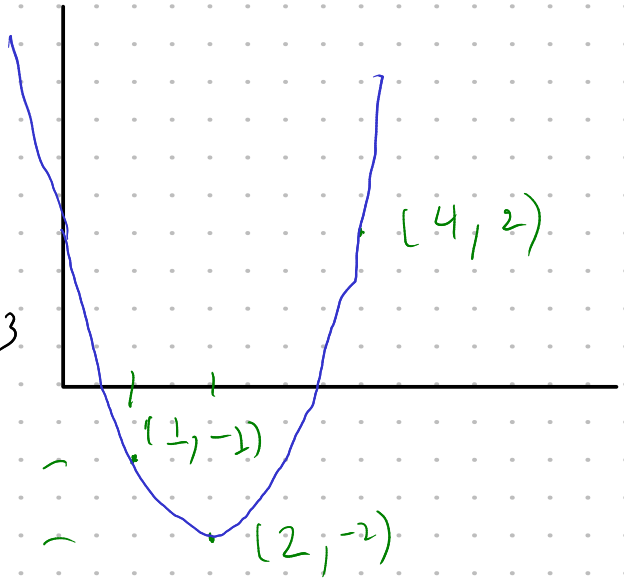
$$0 \qquad\qquad 0 \qquad\qquad 1 \times y_i \qquad 0\,0\,0$$

$f(x_i) = y_i$

$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} + \cdots$

$f(x) = x^2$

$f(x) = (x-2)^2 - 2$



$f(x) = l_1(x) y_1 + l_2(x) y_2 + l_3(x) y_3$

$= \frac{(x-2)(x-4)}{(1-2)(1-4)}(-1)$

$+ \frac{(x-1)(x-4)}{(2-1)(2-4)}(-2)$

$+ \frac{(x-1)(x-2)}{(4-1)(4-2)}(2)$

$f(1) = 1(-1) + 0 + 0$

$f(1) = -1$

$f(2) = 0 + 1 \cdot (-2) + 0$

$= -2$

$f(4) = 0 + 0 + 1 \times 2 = 2$