

## TALLER 23

Por medio de polinomios de interpolación de Lagrange, halle los polinomios de interpolación de Lagrange, halle los polinomios de grados 1 y 2 para estimar el valor de  $f(2,75)$ . Además, estime  $f(2,75)$  para los grados 1, 2, y 3. Utilice como puntos base

X	f(x)
0	2
2	0,1
4	3
6	4,5
8	7

$P_1(x)$ :

$$f_1(x) = \frac{(x-2)}{(0-2)} \cdot 2 + \frac{(x-0)}{(2-0)} \cdot 0,1$$

$$f_1(x) = -1(x-2) + 0,05 \cdot x$$

$$f_1(x) = -x + 2 + 0,05x$$

$$f_1(x) = -0,95x + 2$$

$P_2(x)$ :

$$f_2(x) = \frac{(x-2)(x-4)}{(0-2)(0-4)} \cdot 2 + \frac{(x-0)(x-4)}{(2-0)(2-4)} \cdot 0,1$$

$$+ \frac{(x-0)(x-2)}{(4-0)(4-2)} \cdot 3$$

$$f_2(x) = \frac{(x-2)(x-4)}{8} \cdot 2 + \frac{x(x-4)}{-4} \cdot 0,1 + \frac{x(x-2)}{8} \cdot 3$$

$$f_2(x) = \frac{2(x-2)(x-4)}{8} - \frac{0,1x(x-4)}{4} + \frac{3x(x-2)}{8}$$

$$f_2(x) = \frac{1}{4} (2x^2 - 12x + 16) - \frac{0,1}{4} (x^2 - 4x) + \frac{3}{8} (x^2 - 2x)$$

$$f_2(x) = \frac{1}{4} (4,9x^2 - 18,6x + 16)$$

$$f_2(x) = 1,225x^2 - 4,65x + 4$$

$P_3(x)$

$$f_3(x) = \frac{(x-2)(x-4)(x-6)}{(0-2)(0-4)(0-6)} \cdot 0,1 + \frac{(x-0)(x-4)(x-6)}{(2-0)(2-4)(2-6)} \cdot 0,1 + \frac{(x-0)(x-2)(x-6)}{(4-0)(4-2)(4-6)} \cdot 0,1 + \frac{(x-0)(x-2)(x-4)}{(6-0)(6-2)(6-4)} \cdot 0,1$$

$$f_3(x) = \frac{(x-2)(x-4)(x-6)}{-48} \cdot 0,1 + \frac{x(x-4)(x-6)}{-8} \cdot 0,1 + \frac{x(x-2)(x-6)}{8} \cdot 0,1 + \frac{x(x-2)(x-4)}{12} \cdot 0,1$$

$$f_3(x) = \frac{1}{-48} (x-2)(x-4)(x-6) - \frac{0,1}{8} x(x-4)(x-6) + \frac{0,1}{8} x(x-2)(x-6) + \frac{0,1}{12} x(x-2)(x-4)$$

$$f_3(x) = -\frac{1}{24} (x-2)(x-4)(x-6) - \frac{0,1}{80} x(x-4)(x-6) + \frac{0,1}{8} x(x-2)(x-6) + \frac{0,1}{12} x(x-2)(x-4)$$

$$f_3(x) = -\frac{1}{24} (x^3 - 12x^2 + 44x - 48) - \frac{0,1}{80} (x^3 - 4x^2 + 24x) + \frac{0,1}{8} (x^3 - 8x^2 + 17x) + \frac{0,1}{12} (x^3 - 6x^2 + 8x)$$

$$f_3(x) = \frac{1}{24}x^3 + \frac{1}{2}x^2 - \frac{11}{6}x + 2 - \frac{1}{800}x^3 + \frac{1}{8}x^2 - \frac{6}{5}x + \frac{3}{8}x^3 - 2x^2 + 3x + \frac{3}{8}x^3 - \frac{3}{2}x^2 + 2x$$

$$= \frac{67}{240}x^3 - \frac{15}{8}x^2 + \frac{5}{2}x + 2$$

$$f_3(2,75) = \frac{67}{240}(2,75)^3 - \frac{15}{8}(2,75)^2 + \frac{5}{2} \cdot 2,75 + 2$$

$$\Rightarrow 5,745 - 13,496 + 6,875 + 2$$

$$\Rightarrow 1,124$$