

# Metodos Numericos

## Adolfo Hernández Ramírez

x	f(x)
1	0
4	1.386299
5	1.609488
6	1.791752

Evaluar  $f(2)$  usando la interpolación lineal, cuadrática y cúbica.

Para la cuadrática:

$$f_3(x) = f(x_0) + (x-x_0) f(x_1, x_0) + (x-x_0)(x-x_1) f(x_2, x_1, x_0) + (x-x_0)(x-x_1)(x-x_2) f(x_3, x_2, x_1, x_0)$$

$$f(x_3, x_2, x_1, x_0) = \frac{f(x_3, x_2, x_1) - f(x_3, x_2, x_0)}{x_3 - x_0}$$

$$= \frac{\frac{f(x_3, x_2) - f(x_2, x_1)}{x_3 - x_1} - \frac{f(x_3, x_2) - f(x_2, x_0)}{x_3 - x_0}}{x_3 - x_0}$$

$$= \frac{\frac{f(x_3) - f(x_2)}{x_3 - x_2} - \frac{f(x_2) - f(x_1)}{x_2 - x_0}}{x_3 - x_1} - \frac{\frac{f(x_3) - f(x_2)}{x_3 - x_2} - \frac{f(x_2) - f(x_0)}{x_2 - x_0}}{x_3 - x_0}$$

$$f(x_1, x_0) = \frac{f(x_1) - f(x_0)}{x_1 - x_0} = \frac{1.386299 - 0}{4 - 1} = 0.462098$$

$$f(x_2, x_1, x_0) = \frac{\frac{f(x_2) - f(x_1)}{x_2 - x_1} - \frac{f(x_1) - f(x_0)}{x_1 - x_0}}{x_2 - x_0} = \frac{\frac{1.609488 - 1.386299}{5 - 4} - 0.462098}{6 - 4} = -0.0597385$$

$$f(x_3, x_2, x_1, x_0) = \frac{\frac{0.18814 - 0.223144}{6 - 4} - \frac{0.18814 - 0.902309}{6 - 1}}{6 - 1}$$

$$f(x_0, x_2, x_1, x_0) = \frac{0.023594}{5} = 0.0047188$$

$$f(2) = 0.609888$$