Notación

$$\frac{df}{dt} = \lim_{t \to 0} \frac{\Delta f}{\Delta t}$$

$$\frac{df}{dt} \simeq \frac{\Delta f}{\Delta t} = \frac{f(t_{i+1}) - f(t_i)}{t_{i+1} - t_i}$$

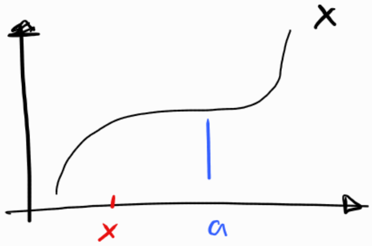
Serie de taylor

$$f(x) = f(a) + f'(a)(x-a) + f''(a)\frac{(x-a)^2}{2!} + \dots + R_n$$

← Residuo

$$R_n = \int_a^x \frac{(x-a)^n f^{(n+1)}(a)}{n!} da$$

a: Variable muda



Otra expresion es

$$R_n = \frac{f^{(n+1)}(\varepsilon)(x-a)^{n+1}}{n+1}$$

↳ Forma de Lagrange de Residuos

$$h = x_{i+1} - x_i$$

$$f(x) = -0.1x^4 - 0.15x^3 - 0.5x^2 - 0.25x + 1.2$$

Predecir el valor en $x = 1$ con $h = 1$ usando la serie de taylor de orden $\emptyset$ hasta 4. calculando el residuo en cada caso

n	$f(x+1)$	R_n
0	1.2	-0.91
1	$(1.2)+(-0.25)=0.95$	-0.875
2	0.45	-0.35
3	0.30	-0.1
4	0.2	$\emptyset$

Como $h = 1$ t. que $(x_{i+1} - x_i) = 1$

$x_{i+1} = 1$

$x_i = \emptyset$

Se sigue la forma

$$\frac{f^{(n+1)}(\varepsilon)(x_{i+1} - x_i)^n}{(n+1)!}$$

$n = \emptyset$

funcion

$$\frac{f^{(\emptyset)}(\emptyset)1}{\emptyset!} = 1.2$$

Residuo

$$\frac{f^{(1)}(0.5)(1)}{1!} = -0.91$$

$n = 1$

funcion

$$\frac{f^{(1)}(\emptyset)1}{1!} = -0.25$$

$$\frac{f^{(2)}(0.5)}{2!} = \left.\frac{-1.2x^2 - 0.9x - 1}{2!}\right|^{0.5} = -0.875$$

$n=2$

$$\frac{f^{(2)}(\emptyset)(1)}{2!} = \frac{-1.2x^2 - 0.9x - 1}{2!}\Big|^{\emptyset} = -0.5$$

$$\frac{f^{(3)}(0.5)}{3!} = \frac{-2.4x - 0.9}{3!}\Big|^{0.5} = -0.35$$

$n=3$

$$\frac{f^{(3)}(\emptyset)(1)}{3!} = \frac{-2.4x - 0.9}{3!}\Big|^{\emptyset} = -0.15$$

$$R_n \quad \frac{f^{(4)}(0.5)}{4!} = \frac{-2.4}{4!}\Big|^{\emptyset} = -0.1$$

$n=4$

// // $= -0.1$

$$R_n \quad \frac{f^{(5)}(0.5)}{5!} = \frac{\emptyset}{5!} = \emptyset$$

Predecir el valor de $f(x)$ en $x = \pi/3$ en torno a $\frac{\pi}{4}$ en orden 0 a 4 calculando el residuo de cada uno

$x_{i+1} = \pi/3$

$x_i = \pi/4$

$h = \frac{\pi}{3} - \frac{\pi}{4}$

$h = 15°$

n	f(x+1)	R_n
0	0.71	0.13
1		
2		
3		
4		

n= 1

$$f(\pi/4) = 0.71$$

$$\frac{f'(7\pi/24)(1)}{1!} = \operatorname{Sen}(7\pi/24) = 0.13$$

n= 2