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Notación

$$f(x_{i+1}) = f(x_i) + f'(x_i)h + \frac{f''(x_i)h^2}{2!} + \frac{f^{3}(x_i)h^3}{3!} \dots$$

$$+ \frac{f^{(n)}(x_i)h^n}{n!} + \underbrace{\frac{f^{(n+1)}(x_i)h^{(n+1)}}{(n+1)!}}_{R_n}$$

Ejemplo:

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

predecir el valor en $x = 1$ con $h = 1$ usando la serie de Taylor de orden cero hasta 4, y calculando el residuo en cada caso.

$x_{i+1} = 1$

$x_i = 0$

$\xi = 0.5$

n	f(x=1)	Rn	Error
0	1.2	-0.91	.1
1	0.95	-0.87	-0.75
2	0.45	-0.35	-0.25
3	0.3	-0.1	-0.1
4	0.2	0	0

$f'(x) = -0.4x^3 - 0.45x^2 - 1.0x - 0.25$

$f'(0.5) = -0.9125$

$f'(0) = -0.25$

$f''(x) = -1.2x^2 - 0.9x - 1 -$

$f''(0.5) = -1.75$

$f^3(x) = -2.4x - 0.9$

$f^4(x) = -2.4$

$f(1) = 0.2$

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$f(x) = \cos(x)$

predecir el valor en $x = \pi/3$ usando serie de Taylor de 0 a 4 y calculando error en cada caso. En torno a $x = \pi/4$

n	$f(\pi/4)$	Rn	E
0	0.71	-0.13	-0.2
1	0.82	-0.129	0.02
2	0.496	0.001	0.004
3	0.498	7×10^{-4}	0.002
4	0.498	-5×10^{-6}	0.002

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

$x_i = \pi/4$

$E = \pi/24$

$h = \pi/12$

$f'(x) = -\operatorname{sen}(x)$

$f'(\pi/24) = -0.13$

$f^3(x) = \operatorname{sen}(x)$

$f^5(x) = -\operatorname{sen}(x)$

$f''(x) = -\cos(x)$

$f''(\pi/24) =$

$f^4(x) = \cos(x)$