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Predice el valor de $x=1$ con $h=1$ usando la serie de Taylor de orden 0 hasta 4 y calculando el residuo en cada caso.

n	$f(x)=1$	R_n	$t = f(x)$ - aproximación
0	1.2	0.9125	$1-f(x) = 0.2 - 1.2 = -1$
1	0.95	-0.875	$0.2 - 0.95 = -0.75$
2	0.45	-0.35	$0.2 - 0.45 = -0.25$
3	0.3	-0.1	$0.2 - 0.3 = -1$
4	0.2	0	$0.2 - 0.2 = 0$

Función original: $-0.1x^4 - 0.15x^3 - 0.5x^2 - 0.25x + 1.2$

$$R_n = \frac{f'(0.5)(h)^1}{1!}$$

$$R_n = \frac{f^{(n+1)}(x_i)h^{(n+1)}}{(n+1)!}$$ } Error de truncamiento.

Para $n=0$

1. $R_n(0) = \frac{f'(0.5)(h)^0}{1!} = \frac{f(0.5)}{1!} = 0.5$
2. Tomamos un punto medio entre 0 y 1 = 0.5 y sustituimos en la primera derivada de la función original.

$f(x)' = -0.4x^3 - 0.45x^2 - 1x - 0.25$

3. $f(0.5) = -0.4(0.5)^3 - 0.45(0.5)^2 - (0.5) - 0.25 = \underline{0.9125}$
4. $f(1) = -0.1(1)^4 - 0.15(1)^3 - 0.5(1)^2 - 0.25(1) + 1.2 = 0.2$

$n=1$

$$R_n(0) = \frac{f''(0.5)(h)^1}{1!} =$$

$f(0) = 1' - 0.4(0)^3 - 0.45(0)^2 - (0) - 0.25 = -0.25$

R

$f(0) = 1.2 + \frac{f(0)h^1}{1!}$

$f(0) = 1.2 + \frac{-0.25(1)!}{1!} = 0.95$

R_n = Como en la anterior fue la 1° derivada, en esta es la 2° derivada

$= R_n(0) = \frac{f''(0.5)h^{2!}}{2!}$

$f''(0.5) = -1.2x^2 - 0.9x - 1 = -1.2(0.5)^2 - 0.9(0.5) - 1 = -1.75$

$R_n = \frac{-1.75(1)^{2!}}{2!} = -0.875$

Error $= +0.2 - 0.95 = -0.75$

$n=2$

$f'(0) = -1.2x^2 - 0.9x - 1 = -1.2(0)^2 - 0.9(0) - 1 = -1$

$f''(0) = 1.2 + \frac{f(0)h^1}{1!} + \frac{f''(0)h^{2!}}{2!} =$

Error $= 0.2 - 0.45 = -0.25$

$f''(0) = 1.2 + (-0.25) + (-1) = 0.45$

$R_n = (0) = \frac{f'''(0.5)h^{3!}}{3!}$

$f'''(0) = -2.4x - 0.9 = -2.4(0.5) - 0.9 = 0.21$

$R_n = \frac{0.21(1)^{3!}}{3!} = -0.35$

$n=3$

$f'''(0) = -2.4(0) - 0.9 = -0.9$

$f'''(0) = \frac{-0.9(1)^3}{3!} = -0.15$

$f(0) = 0.45 - 0.15 = 0.3$

$R_n = \frac{f^{(4)}(h)^{4!}}{4!}$

$f^{(4)} = \frac{-2.4(1)^{4!}}{4!} = -0.1$

$n = 4$

$$f^{IV}(0) = 1.2 + \frac{f'(0)(h)^{1!}}{1!} + \frac{f''(0)(h)^{2!}}{2!} + \frac{f'''(0)(h)^{3!}}{3!} + \frac{f^{IV}(0)(h)^{4!}}{4!}$$

$$f^{IV}(0) = -0.1$$

$$f^{IV}(0) = 0.30 - 0.1 = 0.20$$

$$R_n = \frac{f^{(5)} h^{5!}}{5!} = \frac{0(1)^{5!}}{5!} = 0.$$

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