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Parcial #2

1.

a- 155,4087104999 = 155,41

b- 637,998000000 9 = 638

c- 0,7549108 99 = 0,75491

d- 4,999599999 = 4,9996

e- 709,430999997 = 709,43

2.

$\tilde{x} = 0,5$

$\Delta\tilde{x} = 0,001$

$x \in [\tilde{x} - \Delta\tilde{x}, \tilde{x} + \Delta\tilde{x}]$

$x \in [0,499, 0.501]$

$$\Delta_f(\tilde{x}) = |f'(\tilde{x})| \Delta\tilde{x}$$

$$\Delta f(0,5) = |3\cos((0.5^2-1)| \cdot 0.001$$

$$\Delta f(0,5) = 0,0021950666$$

Derivada

$f(x) = 3\,\mathrm{sen}(x^2-1)$

$f'(x) = 6x\cos(x^2-1)$

$f(x) \in [0.013084 - 0.0021950666, 0.013084 + 0.0021950666$

$f(x) \in [0.0108439334, 0.0152840666$

3. $F(3{,}001)$

$f(x) = 0{,}75x^4 - 1.25x^3 + 2.5x + 0{,}5$

$x = 3$

$h = 3{,}001 - 3$

$h = 0{,}001$

Derivadas

$f(x) = 0{,}75x^4 - 1{,}25x^3 + 2.5x + 0{,}5$

$f'(x) = 3x^3 - 3{,}75x^2 + 2.5$

$f''(x) = 9x^2 - 7.5x$

$f'''(x) = 18x - 7.5$

hallar x_i

$x_i = 3$

$x_{i+1} = 3{,}001$

$h = 0{,}001$

Orden 0

$f(x_{i+1}) \cong f(x_i)$ [1]

$f(3{,}001) \cong f(3) = 0{,}75(3)^4 - 1.25(3)^3 + 2.5(3) + 0.5 = 35$

Orden 1

$f(3{,}001) \cong 35 + f'(3) \cdot 0{,}001 = 35.04 + (49.80 \cdot 0{,}001) = 35{,}08975$

Orden 2

$f(3{,}001) \cong 35{,}08975 + \frac{f''(3)}{2!} \cdot (0{,}001)^2 = 35{,}08975 + \frac{9(3)^2 - 7.5(3)}{2} \cdot (0{,}001)^2 = 35{,}08977925$

Orden 3

$f(3{,}001) \cong 35{,}08977925 + \frac{f'''(3)}{3!} \cdot (0{,}001)^3 = 35{,}08977925 + \frac{18(3) - 7{,}5}{6} \cdot (0{,}001)^3 = 35{,}08977926$

Valor verdadero

$f(3{,}001) = 0{,}75(3{,}001)^4 - 1.25(3.001)^3 + 2.5(3{,}001) + 0{,}5$

$= 35.04977926$

4. $f(x) = 0,2x^5 + 0,1x^4 - 0,5x^3 - 0,2x^2 + x + 2$

$x = 3$

tamaño in = 0,001

Valores verdadero

$f'(3) = 78,1$

$f''(3) = 109,4$

$f(x) = 48.6 + 8.1 - 13.5 - 1.8 + 3 + 2 = 46,4$

$f'(x) = x^4 + 0,4x^3 - 1.5x^2 - 0.4x + 1$

$f''(x) = 4x^3 + 1.2x^2 - 3x - 0.4$

Diferencia finita hacia adelante

$$f'(x_i) \doteq \frac{f(x_{i+1}) - f(x_i)}{h} = \frac{46.27815472 - 46.4}{0.001} = 78.15472$$

$$f''(x_i) = \frac{f(x_{i+2}) - 2f(x_{i+1}) + f(x_i)}{h^2} = \frac{46,55641895 - 2(46.47815472) + 46,4}{(0,001)^2} = 109,51$$

Diferencia finita hacia atras

$$f'(x_i) \doteq \frac{f(x_i) - f(x_{i-1})}{h} = \frac{46,4 - 46,32195468}{0,001} = 78,04532$$

$$f''(x_i) = \frac{f(x_i) - 2f(x_{i-1}) + f(x_{i-2})}{h^2} = \frac{46.4 - 2(46.32195468) + 46.24401865}{(0.001)^2} = 109,29$$

Diferencia finita centrada

$$f'(x_i) = \frac{f(x_{i+1}) - f(x_{i-1})}{2h} = \frac{46.47815472 - 46.32195468}{2 \cdot 0,001} = 78.10002$$

$$f''(x_i) = \frac{f(x_{i+1}) - 2f(x_i) + f(x_{i-1})}{h^2} = \frac{46.47815472 - 2(46.4) + 46.32195468}{0.001^2} = 109,4$$