Tercer Parcial

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① $\int_0^{\pi} (8 + 5 \operatorname{sen}(x)) \, dx$ $n = 4$

i) $h = \dfrac{\pi - 0}{4}$

$$I = (b-a) \cdot \frac{f(x_0) + 2 \sum_{i}^{n-1} f(x_i) + f(x_n)}{2n}$$ $h = \dfrac{\pi}{4}$

$$I = \frac{\pi}{8} \cdot \left[f(0) + 2 \cdot \left(f(\pi/4) + f\left(\frac{\pi}{2}\right) + f\left(\frac{3}{4}\pi\right) \right) + f(\pi) \right]$$

$$I = \frac{\pi}{8} \cdot \left[8 + 2 \cdot \left(\frac{16 + 5\sqrt{2}}{2} + 13 + \frac{16 + 5\sqrt{2}}{2} \right) + 8 \right]$$

$$I = \frac{\pi}{8} \cdot \left[8 + 58 + 10\sqrt{2} + 8 \right]$$

$$I = 34,61333572$$

ii) $I_v = 35,13274123$

$$E_v = \left| \frac{I_v - I}{I_v} \right| = 0,01478408717$$

v) $n = 4$ $h = \dfrac{\pi - 0}{4}$ $h = \dfrac{\pi}{4}$

$$I = (b-a) \cdot \frac{f(x_0) + 4 \cdot \overset{impar}{\sum_{i}} f(x_i) + 2 \cdot \overset{par}{\sum_{i}} f(x_i) + f(x_n)}{3n}$$

$$I = \frac{\pi}{12} \cdot \left[f(0) + 4 \cdot \left(f\left(\frac{\pi}{4}\right) + f\left(\frac{3}{4}\pi\right) \right) + 2 \cdot f\left(\frac{\pi}{2}\right) + f(\pi) \right]$$

$$I = \frac{\pi}{12} \cdot \left[8 + 4 \cdot \left(\frac{16 + 5\sqrt{2}}{2} + \frac{16 + 5\sqrt{2}}{2} \right) + 2 \cdot 13 + 8 \right]$$

$$I = \frac{\pi}{12} \cdot \left[8 + 64 + 20\sqrt{2} + 26 + 8 \right]$$

$$I = 35,15554$$

vi) $E_V = \left| \dfrac{I_V - I}{I_V} \right|$

Usando la I_V definida previamente

$E_V = \underline{0,00648932}$ ✓

② $y' = \dfrac{1}{2}(1+x)y^2 \qquad y(0) = 1 \qquad x = 0 \rightarrow x = 1$

$\qquad h = 0,2$

$f(x,y) = \dfrac{1}{2}(1+x)y^2$

$\underline{x_o = 0 \qquad y_o = 1}$

$K_1 = f(0;1) = \dfrac{1}{2}$

$K_2 = f(0,1 ; 1,05) = 0,606375$

$K_3 = f(0,2 ; 1,14255) = 0,783252$

$y_1 = 1,123625$

$x_1 = 0,2$

$\underline{x_1 = 0,2 \qquad y_1 = 1,123625}$

$K_1 = f(0,2 ; 1,123625) = 0,75752$

$K_2 = f(0,3 ; 1,199377) = 0,935028$

$K_3 = f(0,4 ; 1,346132) = 1,268451$

$y_2 = 1,315828$

$x_2 = 0,4$

$\underline{x_2 = 0,4 \qquad y_2 = 1,315828}$

$K_1 = f(0,4 ; 1,315828) = 1,211982$

$K_2 = f(0,5 ; 1,437026) = 1,548783$

$K_3 = f(0,6; 1,692945) = 2,29285$

$y_3 = 1,639160$

$x_3 = 0,6$

$x_3 = 0,6 \qquad y_3 = 1,639160$

$K_1 = f(0,6; 1,639160) = 2,149477$

$K_2 = f(0,7; 1,854108) = 2,922058$

$K_3 = f(0,8; 2,378088) = 5,089771$

$y_4 = 2,270076$

$x_4 = 0,8$

$x_4 = 0,8 \qquad y_4 = 2,270076$

$K_1 = f(0,8; 2,270076) = 4,637921$

$K_2 = f(0,9; 2,733868) = 7,100333$

$K_3 = f(1; 4,182625) = 17,494351$

$y_5 = 3,954529$

$x_5 = 1$

$x_5 = 1 \qquad y_5 = 3,954529$

X	Y
0	1
0,2	1,123625
0,4	1,315828
0,6	1,639160
0,8	2,270076
1	3,954529