Laboratorio 9

$f(x) = x \ln(x)$ $[1,2]$ $h = 0.25$

$$\int_1^2 x\ln(x)\,dx = \int_1^{1,25} x\ln(x)\,dx + \int_{1,25}^{1,5} x\ln(x)\,dx + \int_{1,5}^{1,75} x\ln(x)\,dx + \int_{1,75}^{2} x\ln(x)\,dx$$

$$= \frac{0,25}{2}(f_0 + f_1 + f_1 + f_2 + f_2 + f_3 + f_3 + f_4)$$

$$= \frac{0,25}{2}(f_0 + 2f_1 + 2f_2 + 2f_3 + f_4)$$

$$\approx \frac{0,25}{2}(0 + 0,557858878 + 1,216395321 + 1,958655758 + 1,386294361)$$

$$\approx 0,643650478$$

$f(x)$, $[x_0, x_2]$

$(x_0, y_0), (x_1, y_1), (x_2, y_2)$

$$\int_{x_0}^{x_2} f(x)\,dx = \frac{h}{3}\left[f(x_0) + 4f(x_1) + f(x_2)\right]$$

$h = x_1 - x_0 = x_2 - x_1$ $\qquad h = \frac{b-a}{M - a \text{ \# intervalos}}$

$$E = \frac{h^5}{90} f^{(4)}(\xi) \quad x_0 < \xi < x_2$$

$f(x) = x\ln(x)$ $\qquad [1,2]$ $\qquad h = 0{,}25$

$M = 4$

$h = x_0 - x_0$ | $h = x_1 - 1{,}5$

$x_1 = 1{,}25$ | $x_2 = 1{,}75$

$x_2 = 1{,}5$ | $x_4 = 2$

$f(x_0) = 0$

$f(x_1) = 0{,}278929431$

$f(x_2) = 1{,}386294361$

$$h = \frac{b-a}{M}$$

$$\int_1^2 x\ln(x)\,dx = \int_1^{1,25} x\ln(x)\,dx + \int_{1,25}^{1,5} x\ln(x)\,dx + \int_{1,5}^{1,75} x\ln(x)\,dx + \int_{1,75}^{2} x\ln(x)\,dx$$

$$\frac{b-a}{3M}$$

$$= \frac{h}{3}\left(f_0 + 4f_1 + f_2 + f_2 + 4f_3 + f_4\right)$$

$$= \frac{0{,}25}{3}\left(f_0 + 4f_1 + 2f_2 + 4f_3 + f_4\right)$$

$$= 0{,}636309830$$