

20 a) Aplica la regla del punto medio con $m = 10$ para obtener una aproximación de la integral

$$\int_1^2 \frac{1}{x} dx$$

$$\begin{aligned} x_0 &= 1 \\ x_1 &= 1,1 \\ x_2 &= 1,2 \\ x_3 &= 1,3 \\ x_4 &= 1,4 \\ x_5 &= 1,5 \\ x_6 &= 1,6 \\ x_7 &= 1,7 \\ x_8 &= 1,8 \\ x_9 &= 1,9 \\ x_{10} &= 2 \end{aligned}$$

Punto medio

$$\begin{aligned} t_1 &= \frac{1+1,1}{2} = 1,05 \\ t_2 &= \frac{1,2+1,1}{2} = 1,15 \\ t_3 &= \frac{1,2+1,3}{2} = 1,25 \\ t_4 &= \frac{1,3+1,4}{2} = 1,35 \\ t_5 &= \frac{1,4+1,5}{2} = 1,45 \\ t_6 &= 1,55 \\ t_7 &= 1,65 \\ t_8 &= 1,75 \\ t_9 &= 1,85 \\ t_{10} &= 1,95 \end{aligned}$$

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

$$h = \frac{2-1}{10} = \frac{1}{10} = 0,1$$

$$f(t_1) = 0,95238$$

$$f(t_2) = 0,86956$$

$$f(t_3) = 0,8$$

$$f(t_4) = 0,74$$

$$f(t_5) = 0,6896$$

$$f(t_6) = 0,645$$

$$f(t_7) = 0,6$$

$$f(t_8) = 0,5714$$

$$f(t_9) = 0,5405$$

$$f(t_{10}) = 0,51282$$

$$\begin{aligned} \int_1^2 \frac{1}{x} dx &\approx 0,1 \cdot [0,95238 + 0,86956 + 0,8 + 0,75 + \\ &+ 0,6896 + 0,645 + 0,6 + 0,5714 + \\ &+ 0,5405 + 0,51282] = \\ &= 0,641844 \end{aligned}$$

$$\int_1^2 \frac{1}{x} dx = \ln|x| \Big|_1^2 = \ln 2 - \frac{\ln 1}{0} = \ln 2 = 0,69314718$$

Ej 2 1

$$h \left[\frac{b-a}{2} + \sum_{i=1}^{n-1} y_i \right]$$

de todos Trapecio

$$x_0 = 1$$

$$x_1 = 1,1$$

$$x_2 = 1,2$$

$$x_3 = 1,3$$

$$x_4 = 1,4$$

$$x_5 = 1,5$$

$$x_6 = 1,6$$

$$x_7 = 1,7$$

$$x_8 = 1,8$$

$$x_9 = 1,9$$

$$x_{10} = 2$$

$$y_0 = 1$$

$$y_1 = 0,9090$$

$$y_2 = 0,833333$$

$$y_3 = 0,769230$$

$$y_4 = 0,714285$$

$$y_5 = 0,666666$$

$$y_6 = 0,625$$

$$y_7 = 0,588235$$

$$y_8 = 0,555555$$

$$y_9 = 0,5263157$$

$$y_{10} = 0,5$$

$$\int_1^2 \frac{1}{x} dx \approx 0,1 \left[\frac{1+0,5}{2} + 0,909090 + 0,833333 + 0,769230 + 0,714285 + 0,666666 + 0,625 + 0,588235 + 0,555555 + 0,5263157 \right]$$

$$\approx 0,1 [0,75 + 6,187709]$$

$$\approx 0,6937709$$

ej 22

$$\frac{h}{3} [E + 4I + 2P]$$

Método de Simpson

$$x_0 = 1$$

$$y_0 = 1$$

$$x_1 = 1,1$$

$$y_1 = 0,909090 \text{ I}$$

$$x_2 = 1,2$$

$$y_2 = 0,88333 \text{ P}$$

$$x_3 = 1,3$$

$$y_3 = 0,769230 \text{ I}$$

$$x_4 = 1,4$$

$$y_4 = 0,714285 \text{ P}$$

$$x_5 = 1,5$$

$$y_5 = 0,666666 \text{ I}$$

$$x_6 = 1,6$$

$$y_6 = 0,625 \text{ P}$$

$$x_7 = 1,7$$

$$y_7 = 0,588235 \text{ I}$$

$$x_8 = 1,8$$

$$y_8 = 0,555555 \text{ P}$$

$$x_9 = 1,9$$

$$y_9 = 0,526315 \text{ I}$$

$$x_{10} = 2$$

$$y_{10} = 0,5$$

$$\begin{aligned} \int_0^1 \frac{1}{x} dx &\approx \frac{0,1}{3} [(1+0,5) + 4(0,909090 + 0,769230 + 0,666666 \\ &\quad + 0,588235 + 0,526315) + 2(0,833333 \\ &\quad + 0,714285 + 0,625 + 0,555555)] \\ &\approx 0,033333 [1,5 + 13,838144 + 5,456346] \\ &\approx 0,693142735 \end{aligned}$$

Punto medio \triangleleft

$$-6,2371944 \cdot 10^{-4}$$

\triangleright Trapecios

$$0,05130318$$

$$5,13 \cdot 10^{-2}$$

Simpson

$$4,4455610$$

