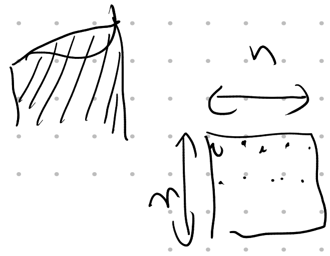
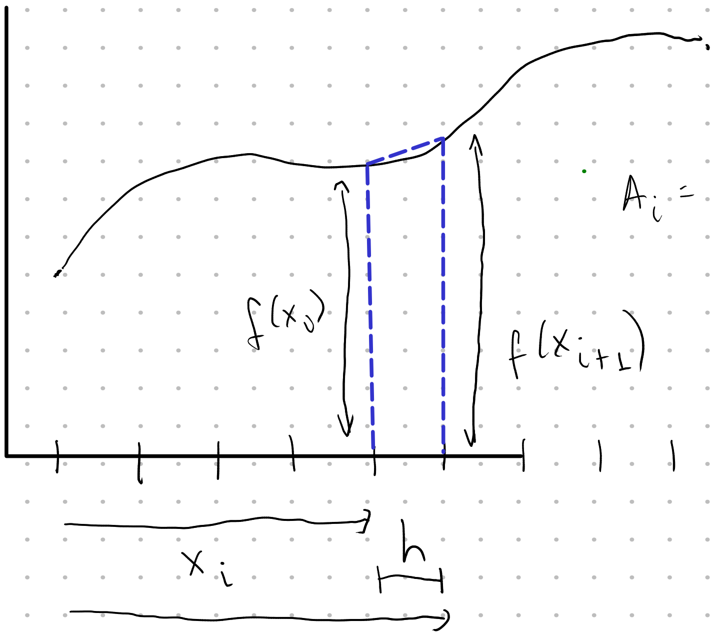
Trapecio Integrate

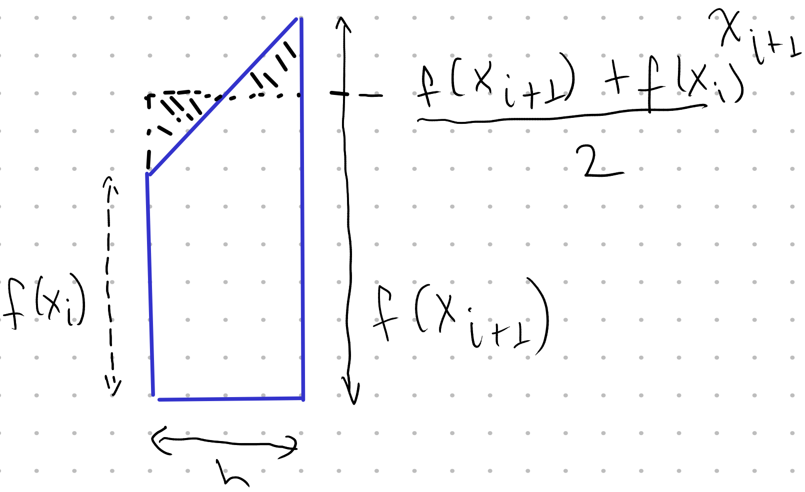
Compuesto



$$\int_a^b f(x)\,dx \approx \frac{h}{2}(f(x_0)+f(x_n)) + h\sum_{j=1}^{n-1} f(x_j)$$



$$A_i = h * \left(\frac{f(x_i)+f(x_{i+1})}{2}\right)$$



$$A_i = h * \left(\frac{f(x_i)+f(x_{i+1})}{2}\right)$$

$$A_T = \sum_{i=0}^{n-1} h * \left(\frac{f(x_i)+f(x_{i+1})}{2}\right)$$

$$= \frac{h}{2} * \left[\sum_{i=0}^{n-1} f(x_i) + \sum_{i=0}^{n-1} f(x_{i+1})\right]$$

$$= \frac{h}{2} * \left[f(x_0) + \sum_{i=1}^{n-1} f(x_i) + f(x_n) + \sum_{i=0}^{n-2} f(x_{i+1})\right]$$

$$\sum_{i=0}^{n-2} f(x_{i+1}) = \sum_{i=1}^{n-1} f(x_i)$$

$$A_T = \frac{h}{2} * \left[f(x_0) + f(x_n) + 2\sum_{i=1}^{n-1} f(x_i) \right]$$

$$= \frac{h}{2} * \left[f(x_0) + f(x_n) \right] + h * \sum_{i=1}^{n-1} f(x_i)$$

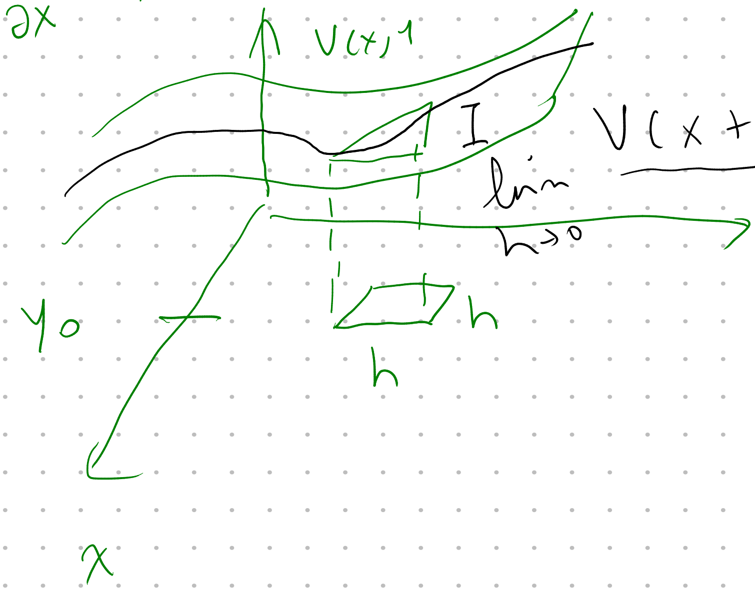
$$= h \left[\frac{\overset{1}{f(x_0)} + f(x_1)}{2} + \frac{f(x_1) + f(x_2)}{2} + \dots + \frac{f(x_{n-1}) + \overset{1}{f(x_n)}}{2} \right]$$

$2 \qquad 2 \qquad 2$

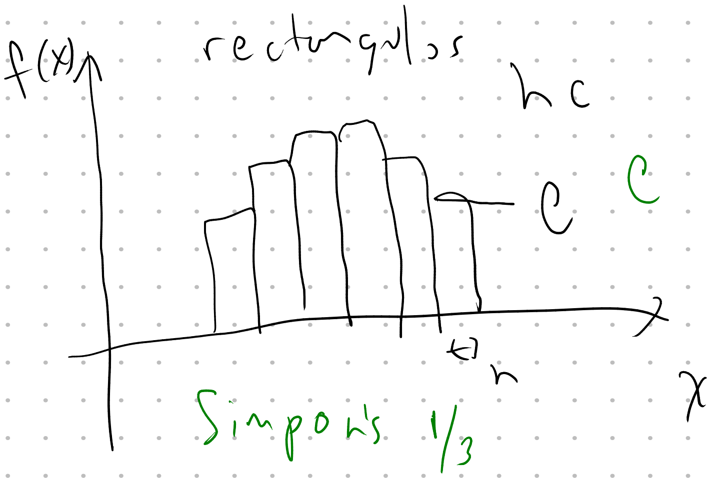
$$\frac{f(x+h)-f(x)}{h}$$

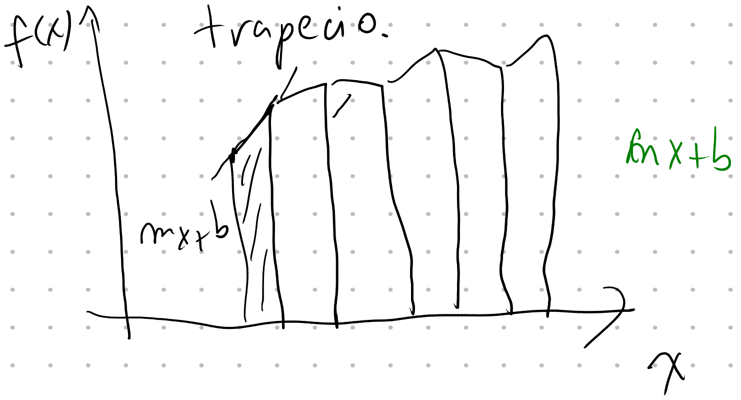
$$\vec{E} = -\vec{\nabla} V$$

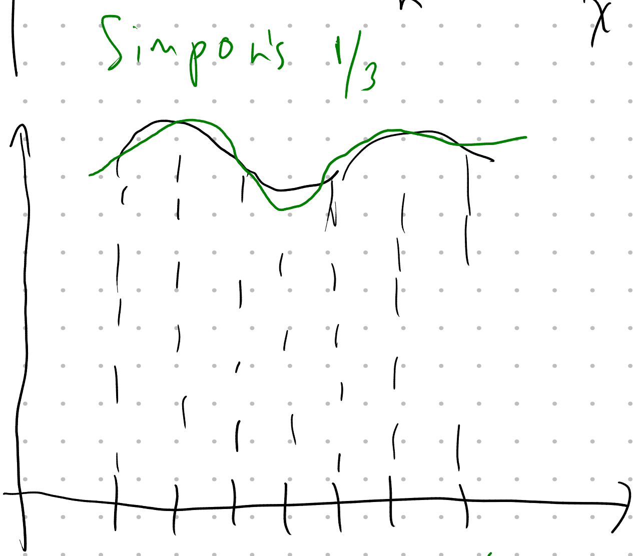
$$= -\frac{\partial}{\partial x} V(x,y)\,\hat{i} + \frac{\partial}{\partial y} V(x,y)\,\hat{j}$$



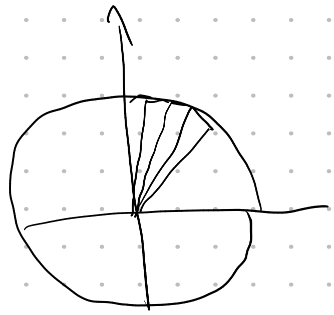
$$\lim_{h \to 0} \frac{V(x+h, y_0) - V(x, y_0)}{h}$$



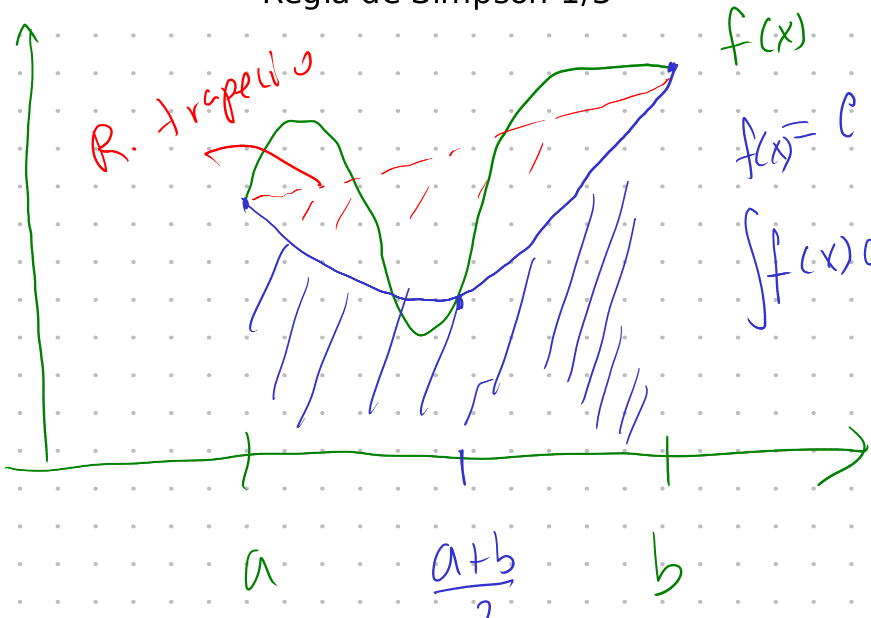




$ax^2 + bx + c$



Regla de Simpson 1/3



$$f(x) = c + dx + ex^2$$

$$\int f(x)\,dx = \left[cx + \frac{dx^2}{2} + \frac{ex^3}{3} \right]_a^b$$

$$(a, f(a)),\ \left(\frac{a+b}{2}, f\left(\frac{a+b}{2}\right)\right),\ (b, f(b))$$

$$f(x) = \frac{\left(x - \left(\frac{a+b}{2}\right)\right)(x-b)}{\left(a - \left(\frac{a+b}{2}\right)\right)(a-b)} f(a) + \frac{(x-a)(x-b)}{\left(\left(\frac{a+b}{2}\right) - a\right)\left(\frac{a+b}{2} - b\right)} f\left(\frac{a+b}{2}\right)$$

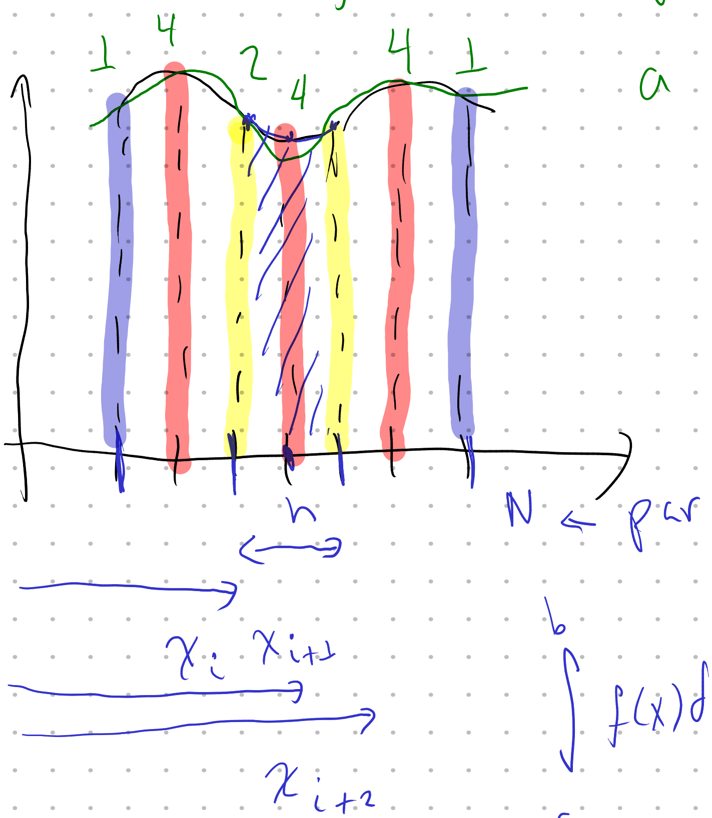
$$+ \frac{(x-a)\left(x - \left(\frac{a+b}{2}\right)\right)}{(b-a)\left(b - \left(\frac{a+b}{2}\right)\right)} f(b)$$

$$f(x) = c + dx + ex^2$$

$$\int_a^b f(x)\,dx = \left. cx + \frac{dx^2}{2} + \frac{ex^3}{3} \right]_a^b$$

$$\int_a^b f(x)\,dx = \frac{(a-b)}{3}\left[f(a) + 4f\left(\frac{a+b}{2}\right) + f(b)\right]$$

Regla de Simpson's Compuesta

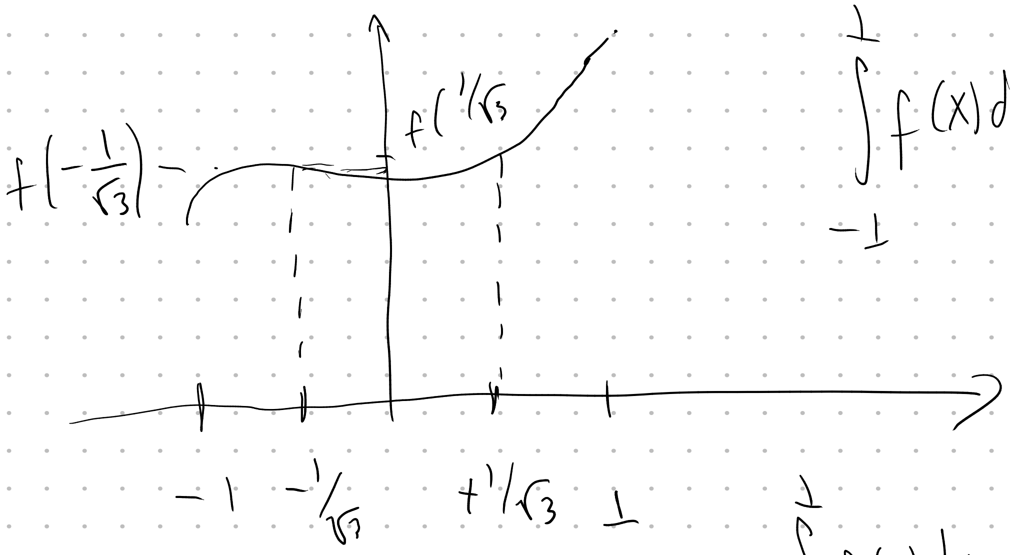


$$\int_{x_i}^{x_{i+2}} f_i(x)\,dx = \frac{h}{3}\left[f(x_i) + 4f(x_{i+1}) + f(x_{i+2})\right]$$

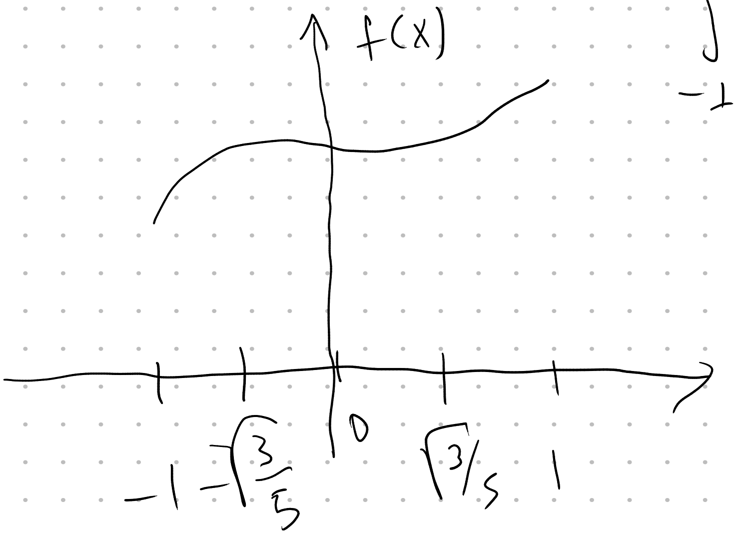
$$\int_a^b f(x)\,dx = \sum_{i=0}^{N-2} \frac{h}{3}\left[f(x_i) + 4f(x_{i+1}) + f(x_{i+2})\right]$$

$$\int_a^b f(x)\,dx = \frac{h}{3}\left[f(x_0) + f(x_N) + 2\sum_{i=1}^{N/2} f(x_{2i}) + 4\sum_{i=0}^{N/2-2} f(x_{2i+1})\right]$$

Introduccion a la Cuadratura Gaussiana



$$\int_{-1}^{1} f(x)\,dx = w_0 f\left(-\frac{1}{\sqrt{3}}\right) + w_1 f\left(\frac{1}{\sqrt{2}}\right)$$
$$= 1\, f\left(-\frac{1}{\sqrt{3}}\right) + 1\, f\left(\frac{1}{\sqrt{3}}\right)$$



$$\int_{-1}^{1} f(x)\,dx$$
$$= w_0 f\left(-\sqrt{\frac{3}{5}}\right) + w_1 f(0) + w_2 f\left(\sqrt{\frac{3}{5}}\right)$$
$$\chi \quad = \frac{5}{9} f\left(-\sqrt{\frac{3}{5}}\right) + \frac{8}{9} f(0) + \frac{5}{9} f\left(\sqrt{\frac{3}{5}}\right)$$

$$\int_{-1}^{1} f(x)\,dx = \sum_{i=1}^{N} w_i f(x_i)$$

N: Grado de la cuadratura.

References

http://mathforcollege.com/nm/mws/gen/07int/mws_gen_int_txt_simpson13.pdf