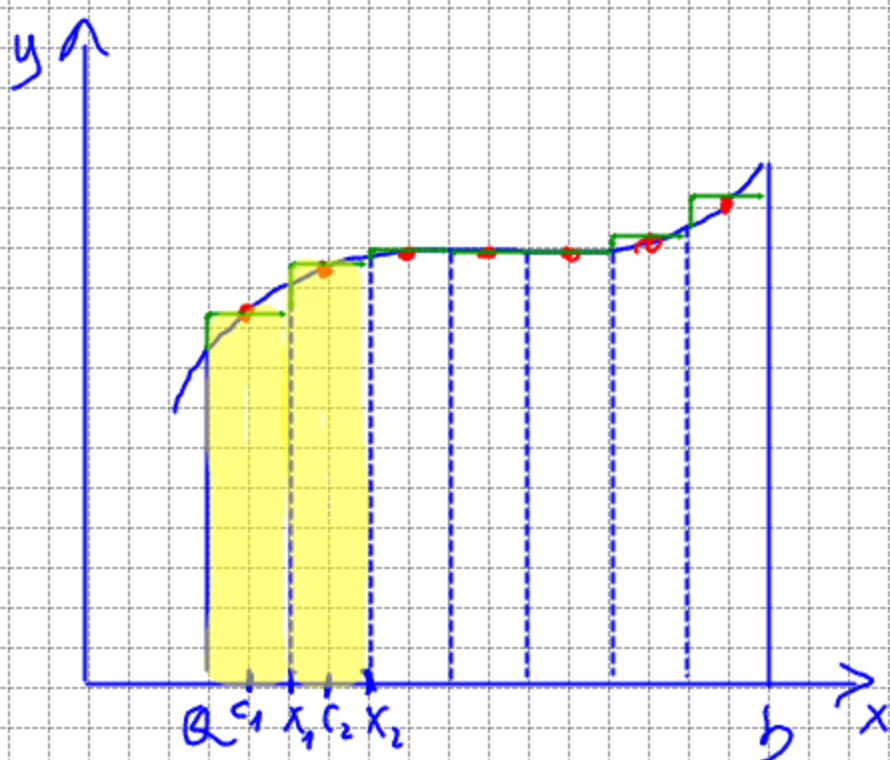


CALCOLO APPROSSIMATO DI UN INTEGRALE

Gia sappiamo che $\int_a^b f(x) dx = \lim_{n \rightarrow \infty} \sum_{i=0}^{n-1} f(c_i)(x_{i+1} - x_i) =$
 $= \lim_{n \rightarrow \infty} \sigma_n$ con $c_i \in [x_i, x_{i+1}]$



Se divido $[a, b]$ in n parti uguali $h = \frac{b-a}{n} = x_{i+1} - x_i$

$$c_1 = a + \frac{h}{2} \quad c_2 = a + \frac{3h}{2} \quad c_3 = a + \frac{5h}{2} \dots$$

$$c_i = a + (2i-1) \frac{h}{2}$$

$$\sigma_n = h \sum_{i=1}^n f\left(a + (2i-1) \frac{h}{2}\right)$$

$$\int_a^b f(x) dx = \lim_{n \rightarrow \infty} h \sum_{i=1}^n f\left(a + (2i-1) \frac{h}{2}\right)$$

ESEMPIO

$$\int_0^{\frac{\pi}{2}} \sin x dx = \left[-\cos x \right]_0^{\frac{\pi}{2}} = -\cos \frac{\pi}{2} + \cos 0 = 1$$

$I = [0, \frac{\pi}{2}]$ divido in tre parti uguali $h = \frac{\pi}{6}$

$$I_1 = [0, \frac{\pi}{6}] \quad I_2 = [\frac{\pi}{6}, \frac{\pi}{3}] \quad I_3 = [\frac{\pi}{3}, \frac{\pi}{2}] \quad h = \frac{\pi}{6}$$

$$c_1 = \frac{\pi}{12}$$

$$c_2 = \frac{\pi}{4}$$

$$c_3 = \frac{5\pi}{12}$$

$$\sin c_1 = 0,25982$$

$$\sin c_2 = 0,70711$$

$$\sin c_3 = 0,96593$$

quindi $\int_0^{\frac{\pi}{2}} \sin x dx = h(\sin c_1 + \sin c_2 + \sin c_3) \approx 1,01152$