Física Computacional I

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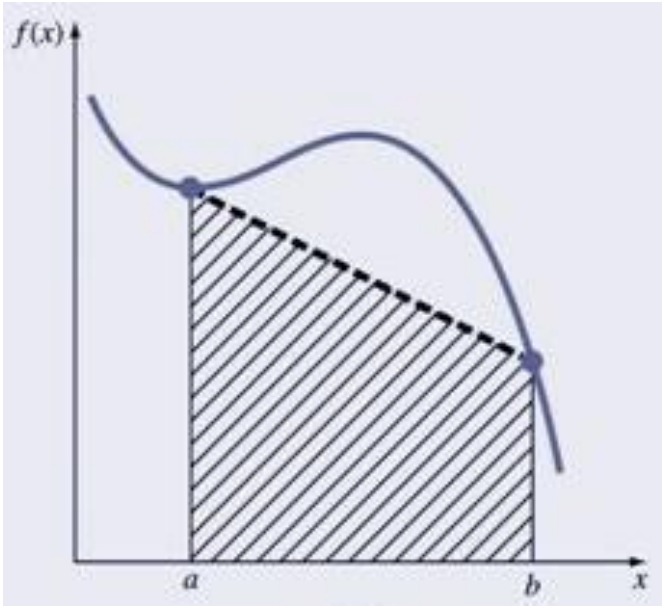
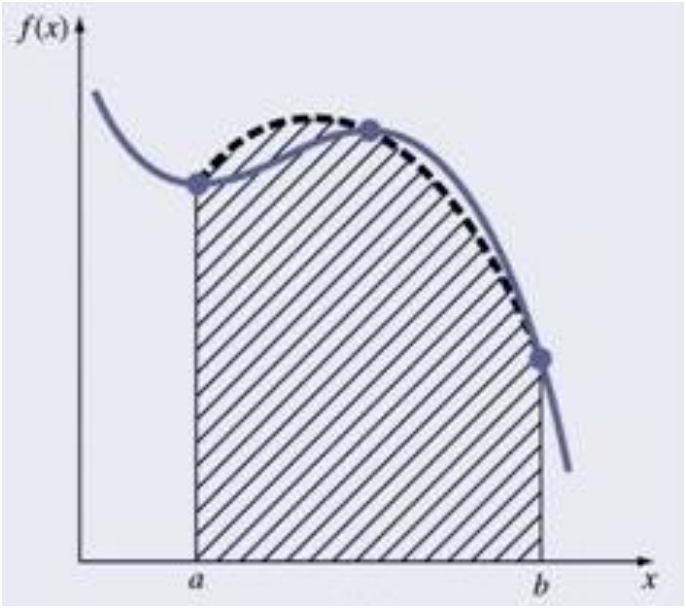
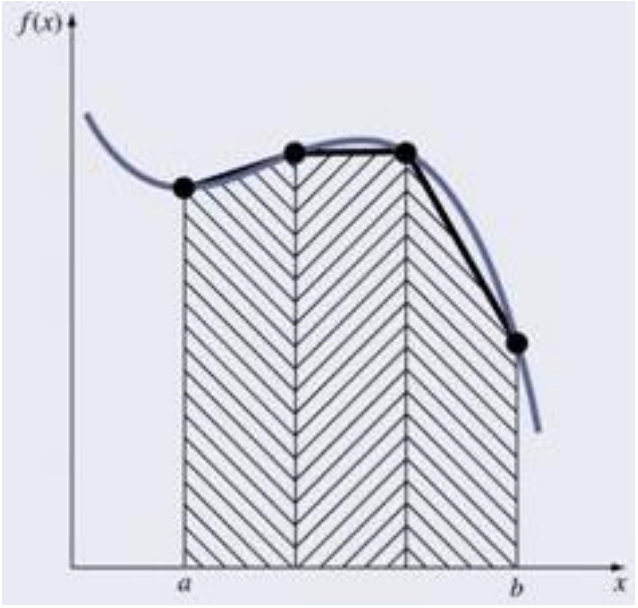
Métodos de Newton-Cotes







- Regra do trapézio:

$$I(a,b) \approx h\left[\frac{1}{2}f(a) + \frac{1}{2}f(b) + \sum_{k=1}^{N-1} f(a+kh)\right]$$

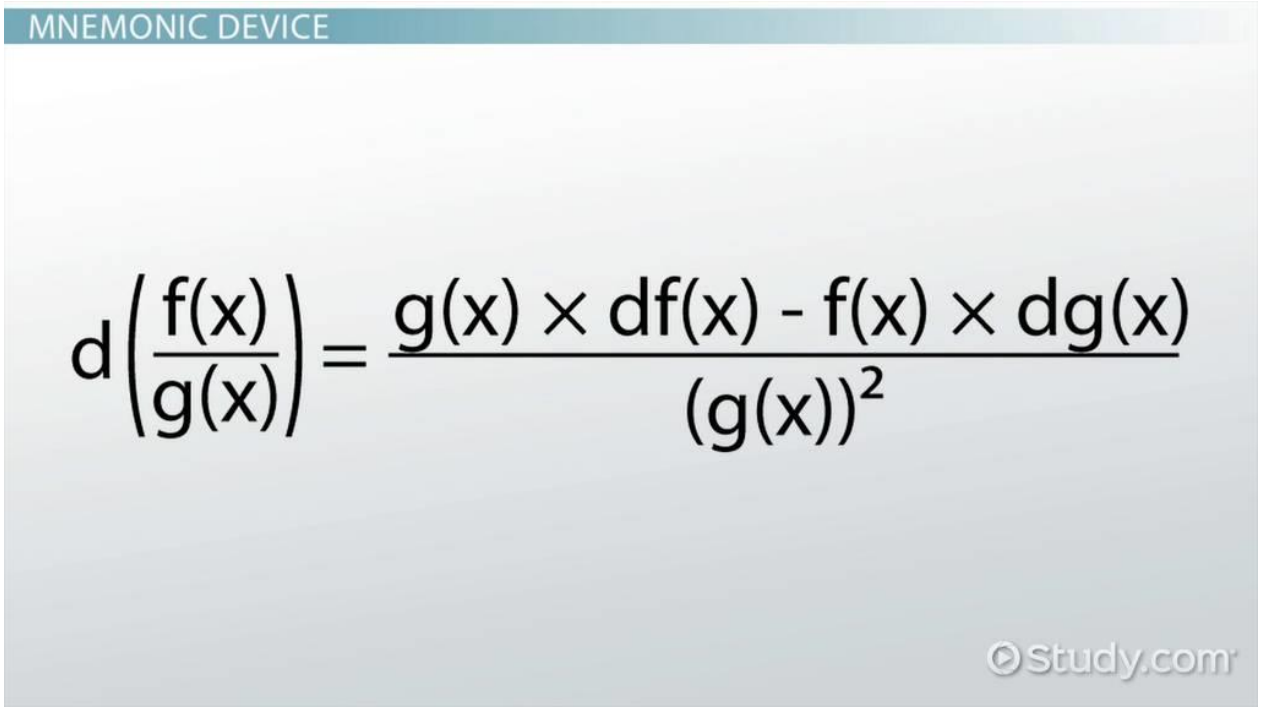
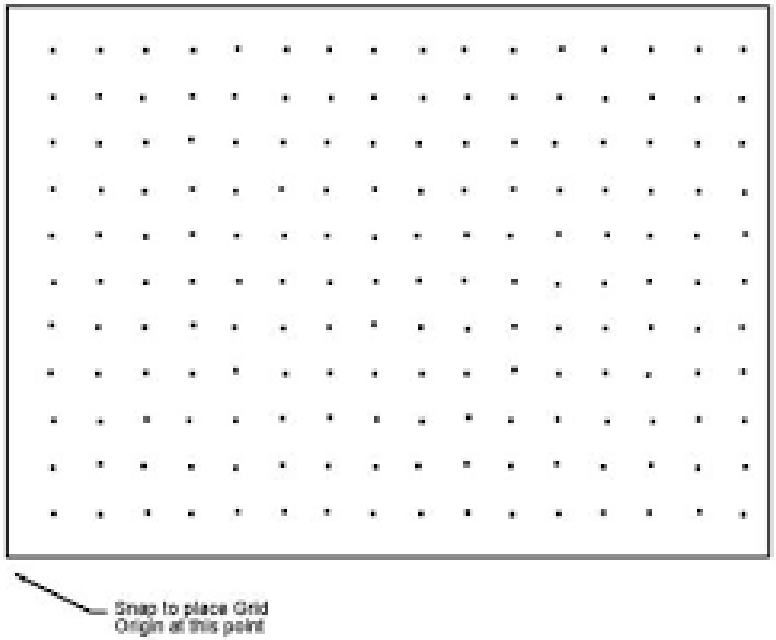
- Regra de Simpson:

$$I(a,b) \approx \frac{h}{3}[f(a) + f(b) + 4 \sum_{k\ (\text{ímpar})=1}^{N-1} f(a+kh) + 2 \sum_{k\ (par)=2}^{N-2} f(a+kh)]$$

Métodos de Newton-Cotes

Degree	Polynomial	Coefficients
1 (trapezoidal rule)	Straight line	$\frac{1}{2}, 1, 1, \ldots, 1, \frac{1}{2}$
2 (Simpson's rule)	Quadratic	$\frac{1}{3}, \frac{4}{3}, \frac{2}{3}, \frac{4}{3}, \ldots, \frac{4}{3}, \frac{1}{3}$
3	Cubic	$\frac{3}{8}, \frac{9}{8}, \frac{9}{8}, \frac{3}{4}, \frac{9}{8}, \frac{9}{8}, \frac{3}{4}, \ldots, \frac{9}{8}, \frac{3}{8}$
4	Quartic	$\frac{14}{45}, \frac{64}{45}, \frac{8}{15}, \frac{64}{45}, \frac{28}{45}, \frac{64}{45}, \frac{8}{15}, \frac{64}{45}, \ldots, \frac{64}{45}, \frac{14}{45}$

Integrais sobre intervalos infinitos



Integração em duas dimensões