# Expansão de Taylor

$$f(x) = f(a) + f^{(1)}(a)(x-a)$$
$$+ \frac{1}{2}f^{(2)}(a)(x-a)^2 + \ldots$$
$$+ \frac{1}{n!}f^{(n)}(a)(x-a)^n + \ldots$$

$$sin(x) = sin(0) + cos(0)(x-0) - \frac{1}{2}sin(0)(x-0)^2 - \frac{1}{6}cos(0)(x-0)^3 + \ldots$$

https://www.intmath.com/series-expansion/taylor-maclaurin-series-interactive.php

# Séries de Fourier

Uma função periódica (entre 0 e P) pode ser expressa (~) como:

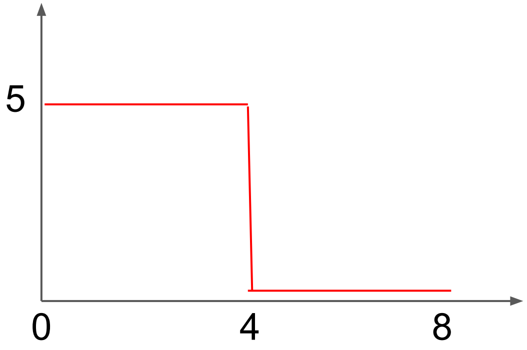
$$f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n cos\left(\frac{2\pi nx}{P}\right) + b_n sin\left(\frac{2\pi nx}{P}\right)$$

$$b_n = \frac{2}{P}\int_0^P sin\left(\frac{2\pi nx}{P}\right) f(x)dx$$

$$a_n = \frac{2}{P}\int_0^P cos\left(\frac{2\pi nx}{P}\right) f(x)dx$$

https://www.intmath.com/fourier-series/fourier-graph-applet.php

# Séries de Fourier




$$a_n = \frac{1}{4}\int_0^4 5cos(\frac{\pi n x}{4})dx = 0$$

$$b_n = \frac{1}{4}\int_0^4 5sin(\frac{\pi n x}{4})dx = \frac{1-(-1)^n}{n\pi}$$

$$f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n cos(\frac{2\pi n x}{P}) + b_n sin(\frac{2\pi n x}{P})$$

$$f(x) = \sum_{n=1}^{\infty} b_n sin(\frac{\pi n x}{4})$$

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