

1 Produto interno de funções - revisão

$$\langle f, g \rangle = \int_{-\frac{T}{2}}^{\frac{T}{2}} f(x) \overline{g(x)} dt$$

2 Séries de Fourier

2.1 Forma exponencial complexa

$$f(t) = \sum_{n=-\infty}^{\infty} c_n e^{in\omega t}$$

$$c_n = \frac{1}{T} \langle f, e^{in\omega t} \rangle = \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) e^{-in\omega t} dt$$

2.2 Forma trigonométrica

$$f(t) = \frac{a_0}{2} + \sum_{k=1}^{\infty} [a_k \cos(k\omega t) + b_k \sin(k\omega t)]$$

$$\frac{a_0}{2} = c_0 = \frac{1}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) dt$$

$$a_k = c_k + c_{-k} = \frac{2}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) \cos(k\omega t) dt$$

$$b_k = i(c_k - c_{-k}) = \frac{2}{T} \int_{-\frac{T}{2}}^{\frac{T}{2}} f(t) \sin(k\omega t) dt$$