Fourierkoefficienterna och Fourierserien

$$c_n = c_n(f) = \frac{1}{|\mathbb{T}|} \int_{\mathbb{T}} f(t)\, e^{-i\, n\, \Omega\, t}\, dt, \text{ där } \Omega = \frac{2\pi}{|\mathbb{T}|}$$

$$a_n = 2\,\mathrm{Re}(c_n) = \frac{2}{|\mathbb{T}|} \int_{\mathbb{T}} f(t) \cos(n\,\Omega\, t)\, dt$$

$$b_n = -2\,\mathrm{Im}(c_n) = \frac{2}{|\mathbb{T}|} \int_{\mathbb{T}} f(t) \sin(n\,\Omega\, t)\, dt$$

Fourierserien

$$f(t) \sim \sum_{n=-\infty}^{\infty} c_n\, e^{i\, n\, \Omega\, t} = \frac{a_0}{2} + \sum_{n=1}^{\infty} \left(a_n \cos(n\,\Omega\, t) + b_n \sin(n\,\Omega\, t)\right)$$

Parsevals formel

$$\frac{1}{|\mathbb{T}|} \int_{\mathbb{T}} |f(t)|^2\, dt = \sum_{n=-\infty}^{\infty} |c_n|^2 = \left(\frac{a_0}{2}\right)^2 + \frac{1}{2} \sum_{n=1}^{\infty} \left(a_n^2 + b_n^2\right)$$

Några trigonometriska formler

$$2\cos(\alpha)\cos(\beta) = \cos(\alpha - \beta) + \cos(\alpha + \beta)$$
$$2\sin(\alpha)\sin(\beta) = \cos(\alpha - \beta) - \cos(\alpha + \beta)$$
$$2\cos(\beta)\sin(\alpha) = \sin(\alpha - \beta) + \sin(\alpha + \beta)$$
$$2\cos^2(\alpha) = 1 + \cos(2\,\alpha)$$
$$2\sin^2(\alpha) = 1 - \cos(2\,\alpha)$$