Teoreema 4.6 Parsevalin lause

Kertolaskulauseen tapaus $f(t) = g(t)$:

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

Entä reaalikertoimilla?

$$\frac{1}{T}\int_{d}^{d+T} f(t)^2\, dt =$$

$$= c_0 c_0^* + \sum_{n=1}^{\infty} c_n c_n^* + \sum_{n=-1}^{-\infty} c_n c_n^* =$$

$$= c_0 c_0^* + \sum_{n=1}^{\infty} c_n c_n^* + \sum_{n=1}^{\infty} c_n^* c_n =$$

$$= c_0 c_0^* + 2\sum_{n=1}^{\infty} c_n c_n^* =$$

$$= \frac{1}{4} a_0{}^2 + 2 \sum_{n=1}^{\infty} \frac{a_n - \mathrm{j} b_n}{2} \frac{a_n + \mathrm{j} b_n}{2} =$$

joten

$$\frac{1}{T} \int_{d}^{d+T} f(t)^2 \, dt = \frac{1}{4} a_0{}^2 + \frac{1}{2} \sum_{n=1}^{\infty} \left(a_n{}^2 + b_n{}^2 \right)$$