

W13TRANCOHSIS

Coherent light.

Fourier transformation of a periodic structure using FT of $\sin x/x$ as transfer function

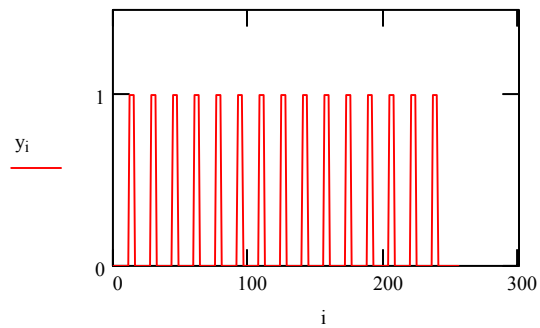
Object: Sum of step functions

$i := 0, 1 \dots 255$

$b := 2$

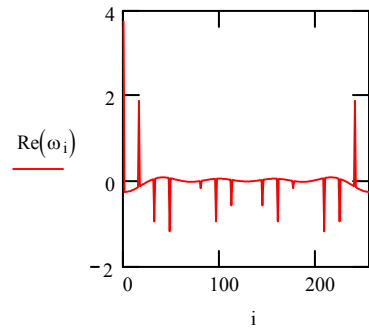
$qq := 14$

$$y_i := \sum_{n=0}^{qq} [\Phi[i - [4 \cdot (2 \cdot n + 1) + 2] \cdot b] - \Phi[i - [4 \cdot (2 \cdot n + 1) + 4] \cdot b]]$$



FT of the object y is ω

$\omega := \text{cfft}(y)$ $N := \text{last}(\omega)$ $N = 255$



The transfer function is FT of s (and not s squared)

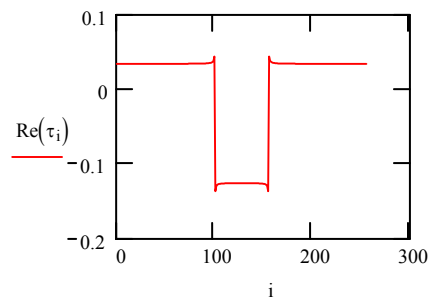
FT of s is transfer function τ

$$s_i := 4 \cdot \frac{\sin\left(\frac{\pi \cdot i}{\text{fn} \cdot \lambda \cdot 255}\right)}{\left(\frac{\pi \cdot i}{\text{fn} \cdot \lambda \cdot 255}\right)}$$

$\tau := \text{cfft}(s)$

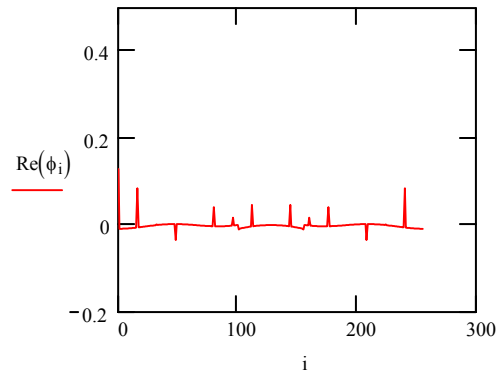
$N := \text{last}(\tau)$

$N = 255$



Product of FT of object and transfer function is the modified FT: ϕ

$$\phi_i := (\tau_i \cdot \omega_i) \quad f_n \equiv 10 \quad \lambda \equiv .0005$$



FT (inverse) of the modified FT is the amplitude of the image yy

$$yy := \text{icfft}(\phi)$$

$$N2 := \text{last}(\phi) \quad N2 = 255$$

The image is the absolute value of yy squared

