questionfft-mathcad11,rev2.mcd

Try these values for z1: 5.00 500

5.3285 502.885

5.2165 503

round(z1 − 10)

z1 := 532.85

f_offset1 := round(z1 − 10)

f_offset2 := round(z1 + δ1 − 35) keeps both spectral sections within graph plot.

bin center

freqz(z1) = 500.01

pwrZ(z1) = 0.5 pwrz(z1) = 0.5

freq in terms of bin #

$$freqz(z) := \frac{N0 \cdot \delta k \cdot z}{\pi}$$

pwrZ(z) := "power in frew spectrum"

Z ← i(z)

$$\left(|Z_0|\right)^2 + 2 \cdot \sum_{k=1}^{last(Z)} \left(|Z_k|\right)^2$$

pwrz(z) := "power in time sequence"

vz ← I(z)

$$\frac{1}{rows(vz)} \cdot \sum_{k=0}^{last(vz)} \left(|vz_k|\right)^2$$

Number of cycles over full sampling interval (N0·Δk repeat interval).
spectral "leakage occurs when this is not an integer.

z1 = 532.85 $\frac{10 \cdot \Delta k \cdot z1}{\pi} = 500.01$ for z1 component

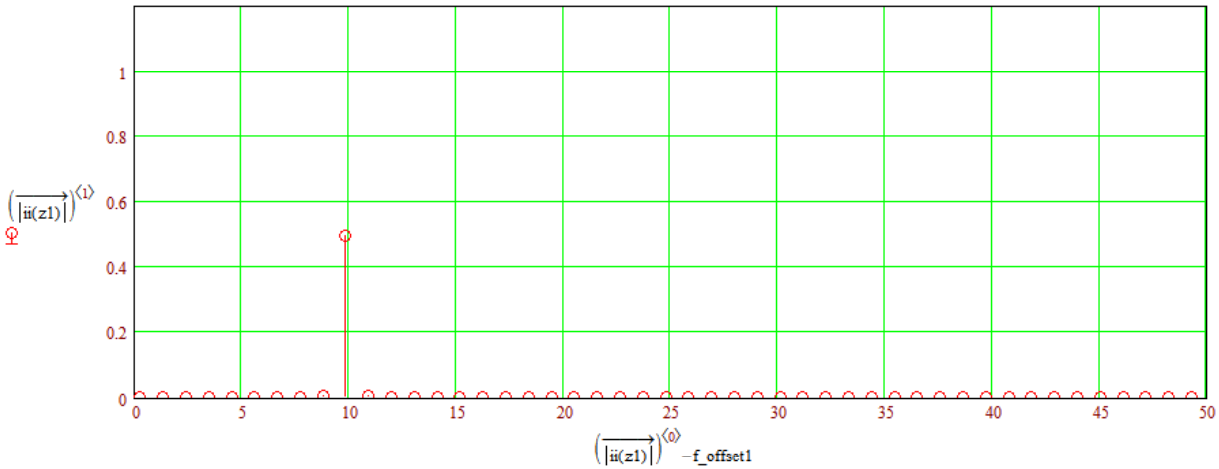
δ1 = 228.16

(z1 + δ1) = 761.01 $\frac{10 \cdot \Delta k \cdot (z1 + \delta 1)}{\pi} = 714.12$ for z1 + δ1 component

Number of samples per cycle (want >2 to prevent aliasing)

$\frac{N0 \cdot \pi}{10 \cdot \Delta k \cdot z0}$ samples per cycle $\frac{N0 \cdot \pi}{10 \cdot \Delta k \cdot z1} = 8.19$ for z1 component

$\frac{N0 \cdot \pi}{10 \cdot \Delta k \cdot (z1 + \delta 1)} = 5.74$ for z1 + δ1 component



z1 spectrum (expanded)

z1 = 532.85