Notes on the Fourier Transform
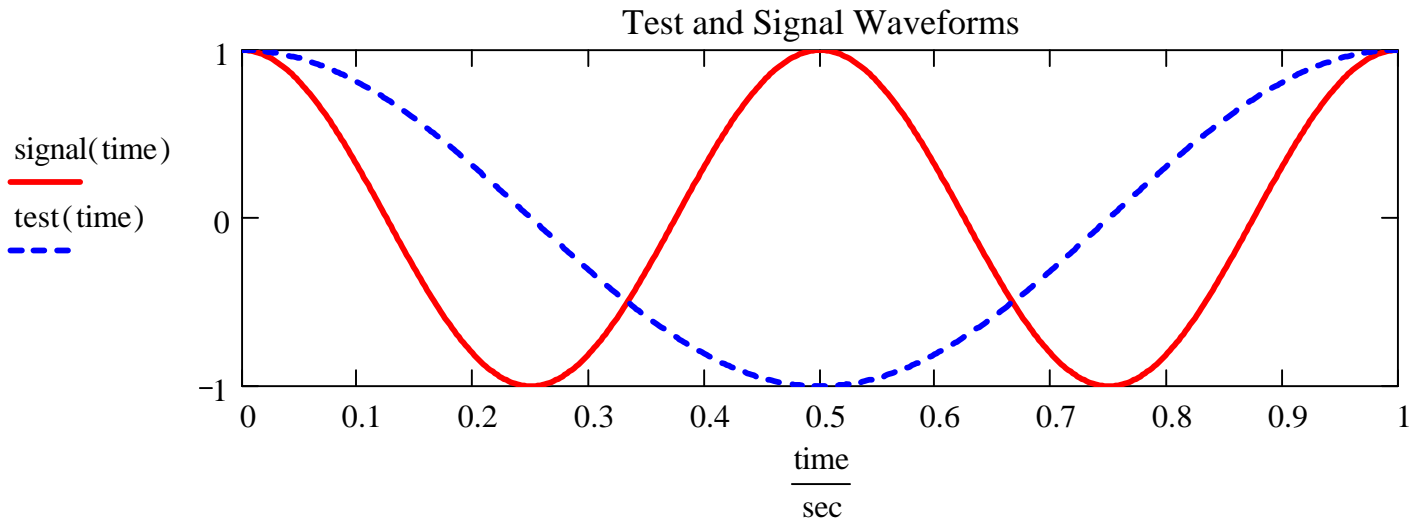
Sample and signal parameters:
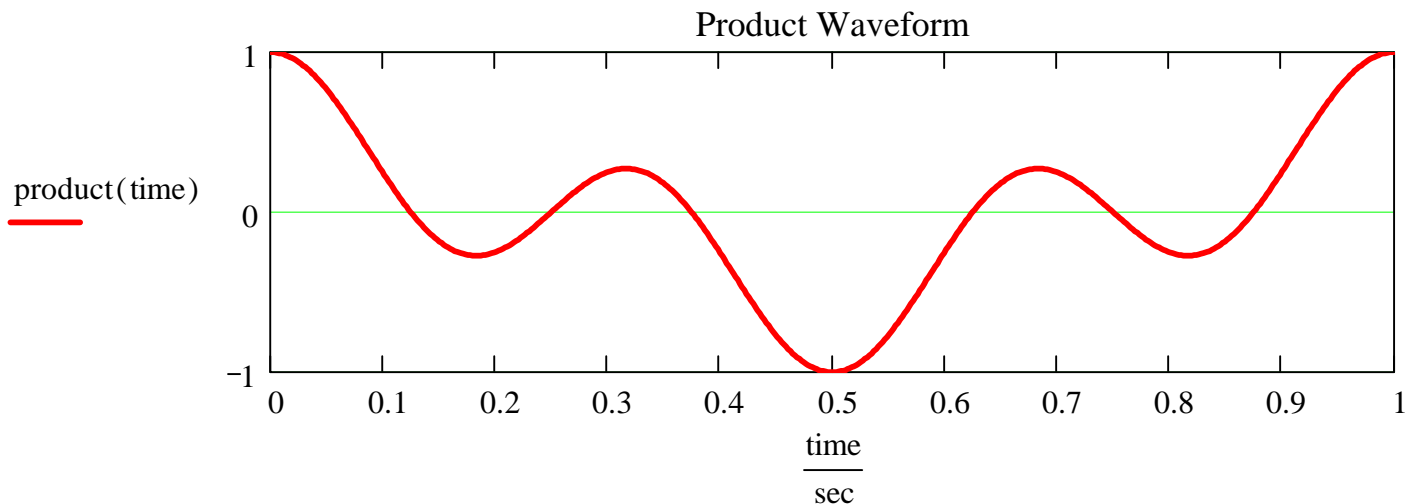
$$\nu_{signal} := (2 \cdot Hz) \quad \omega_{signal} := 2 \cdot \pi \cdot \nu_{signal} \quad \nu_{test} := 1 \cdot Hz \quad \omega_{test} := 2 \cdot \pi \cdot \nu_{test}$$

Equation for the signal wave, test wave and time.

$$time := 0 \cdot sec, \frac{1}{512} \cdot 1 \cdot sec .. 1 \cdot sec \qquad signal(t) := \cos\left(\omega_{signal} \cdot t\right) \qquad test(t) := \cos\left(\omega_{test} \cdot t\right)$$

Test and Signal Waveforms

signal(time)

test(time)

$$product(t) := test(t) \cdot signal(t)$$

Product Waveform

product(time)

Integrate:

Analytically (with calculus)

$$\int_{0 \cdot sec}^{1 \cdot sec} product(t) \, dt = 0 \cdot s$$

Numerically (add the points)

$$\sum_{i=1}^{512} product\left(i \cdot \frac{1 \cdot sec}{512}\right) \cdot \frac{1}{512} \cdot sec = 0 \cdot s$$