C7COHTEMS

Demonstration of the superposition of two waves when integrating over a wavelength interval.

The medium wavelength is $\lambda m = 2$. A phase difference of δ in the x coordinate is studied for 0, 1/2 and 1 medium wavelength.

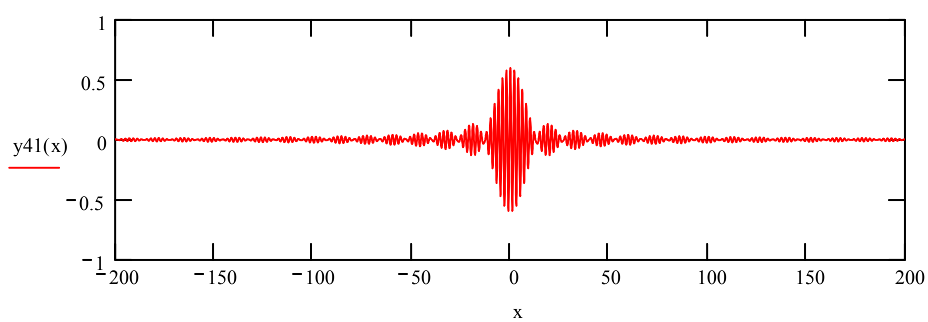
$x := -200, -199.9 .. 200 \quad \lambda m \equiv 2$

$a1 \equiv 0$

$\delta 1 := \lambda m \cdot a1$

1. Integration over the wavelength interval from 1.85 to 2.15 for the superposition of two of the waves, **no phase difference, using δ1=λm*a1,** where λm is medium wavelength.

$$y41(x) := \int_{1.85}^{2.15} \cos\left(2\cdot\pi\cdot\frac{x-\delta 1}{\lambda}\right) + \cos\left(2\cdot\pi\cdot\frac{x}{\lambda}\right) d\lambda \qquad TOL := .1$$



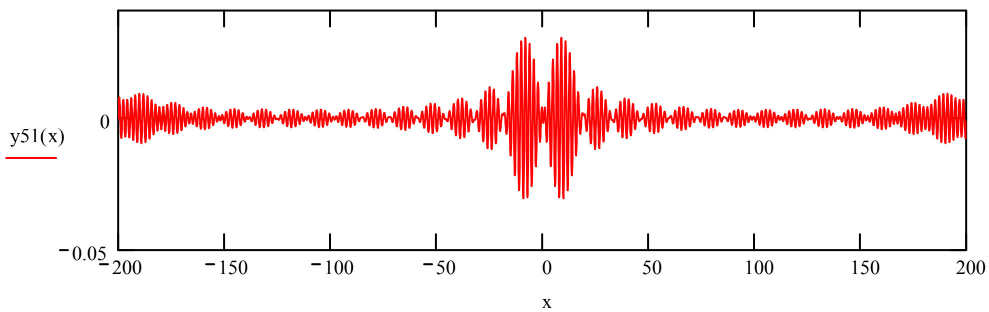
2. Integration over the wavelength interval from 1.85 to 2.15 for the superposition of two waves, for **phase difference, using δ=λm*a2**. The phase difference is (1/2) λm.

$$y51(x) := \int_{1.85}^{2.15} \cos\left(2\cdot\pi\cdot\frac{x - \delta 2}{\lambda}\right) + \cos\left(2\cdot\pi\cdot\frac{x}{\lambda}\right) d\lambda$$

$$a2 \equiv .5$$

$$\delta 2 \equiv \lambda m\cdot a2$$

We have to use an expanded scale to see the result



3. Integration over the wavelength interval from 1.85 to 2.15 for for the superposition of two waves, for **phase difference, using δ3 = λm*a3**.
The phase difference is 1 λm. .

$$y61(x) := \int_{1.85}^{2.15} \cos\left(2\cdot\pi\cdot\frac{x - \delta 3}{\lambda}\right) + \cos\left(2\cdot\pi\cdot\frac{x}{\lambda}\right) d\lambda$$

$$a3 \equiv 1$$

$$\delta 3 \equiv \lambda m\cdot a3$$