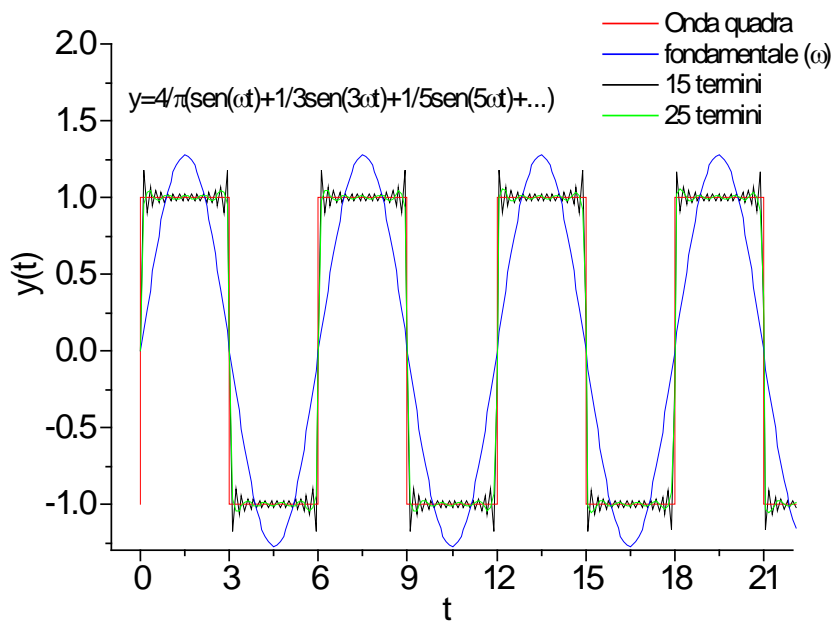
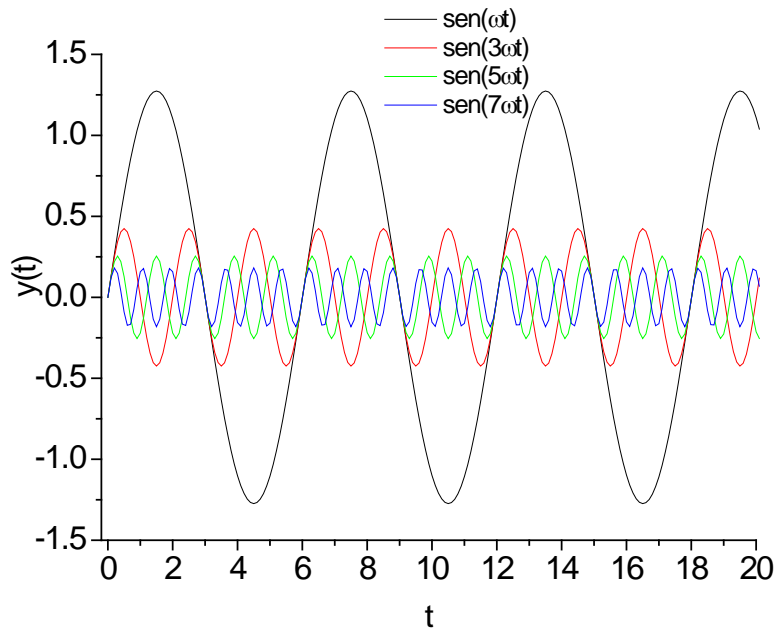


Fourier

Funzioni periodiche: $y(t) = \sum_{\omega_i} A(\omega_i) \text{sen}(\omega_i t)$

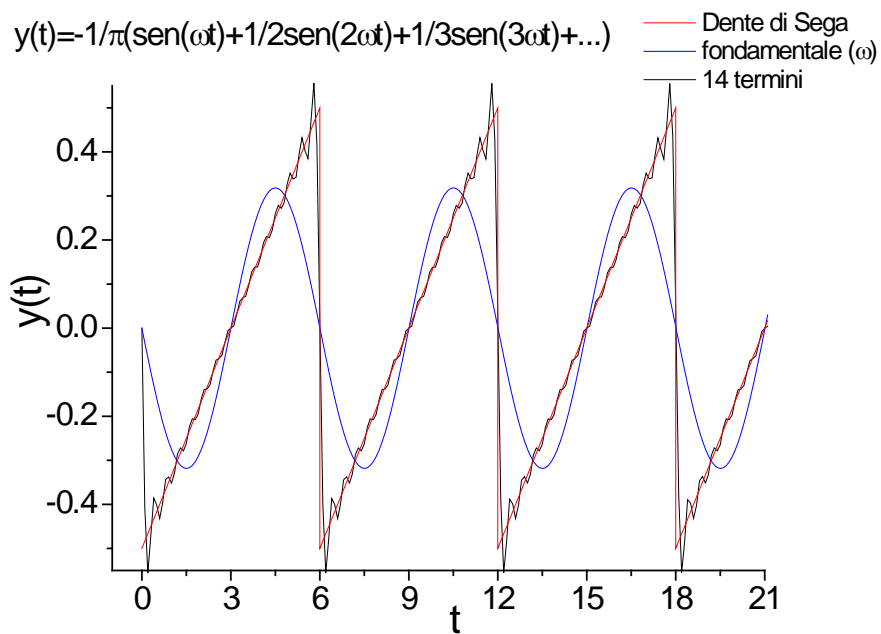
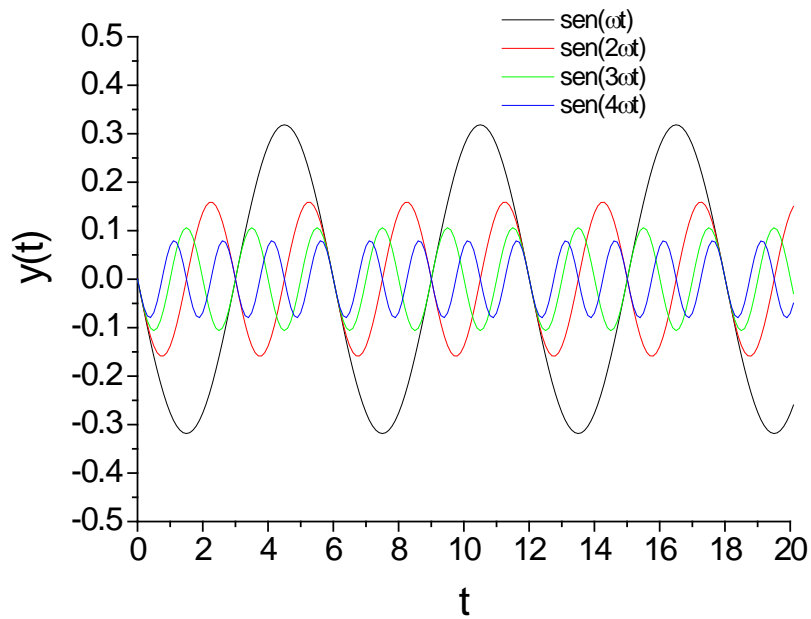
Onda Quadra

$$y(t) = \frac{4}{\pi} \left[\text{sen}(\omega t) + \frac{1}{3} \text{sen}(3\omega t) + \frac{1}{5} \text{sen}(5\omega t) + \frac{1}{7} \text{sen}(7\omega t) + \dots \right]$$



Dente di sega

$$y(t) = -\frac{1}{\pi} \left[\text{sen}(\omega t) + \frac{1}{2} \text{sen}(2\omega t) + \frac{1}{3} \text{sen}(3\omega t) + \dots \right]$$

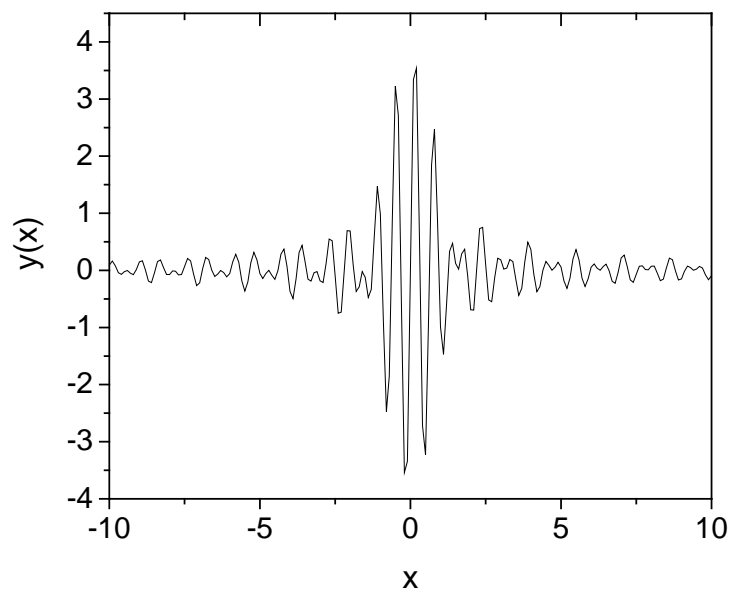
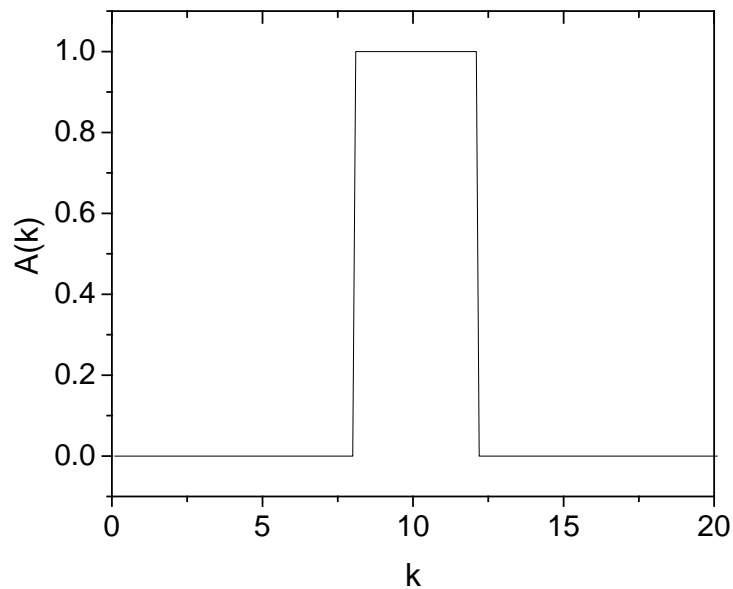


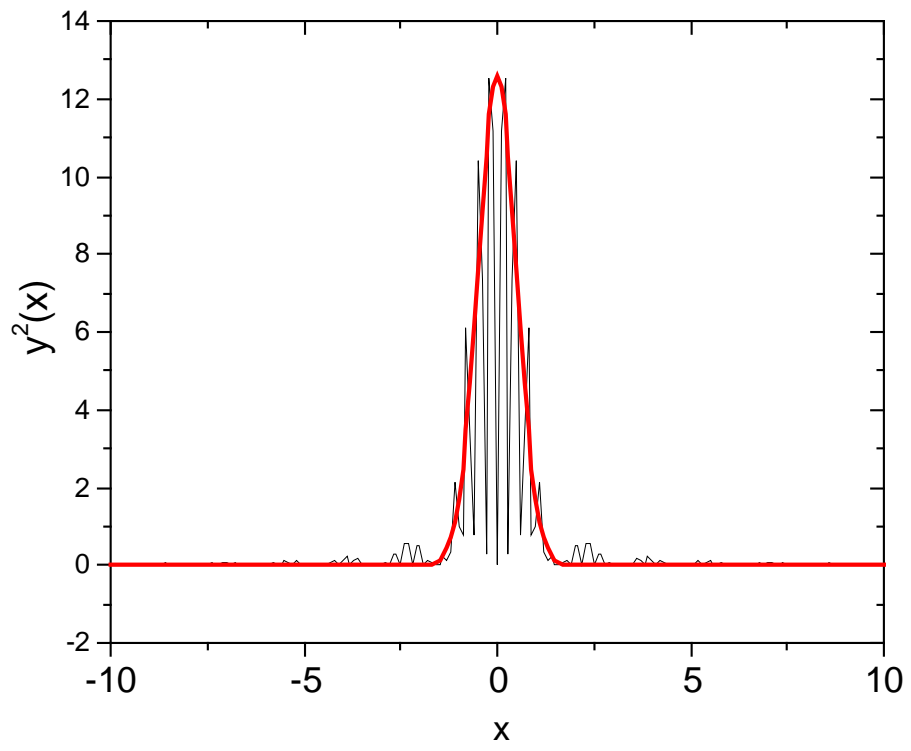
Funzioni non periodiche

$$A(k) = \begin{cases} A \text{ per } k_0 - \frac{\Delta k}{2} < k < k_0 + \frac{\Delta k}{2} \\ 0 \text{ altrimenti} \end{cases}$$

$$y(x) = \int_{-\infty}^{\infty} A(k) \text{sen}(kx) dk = \frac{2A}{x} \text{sen}\left(\frac{\Delta k}{2} x\right) \text{sen}(k_0 x)$$

Con $A=1$, $\Delta k = 4$, $k_0=10$





$$A(k) = B e^{-\alpha(k-k_0)^2/2\Delta k^2}$$

$$y(x) = \int_{-\infty}^{\infty} A(k) \cos(kx) dk = B \sqrt{\frac{2\pi\Delta k^2}{\alpha}} e^{ik_0x} e^{-x^2\Delta k^2/2\alpha}$$

$$|y(x)|^2 = B^2 \frac{2\pi\Delta k^2}{\alpha} e^{-x^2\Delta k^2/\alpha}$$

Per $B=1$, $k_0=10$, $\Delta k=5$, $\alpha=3$:

