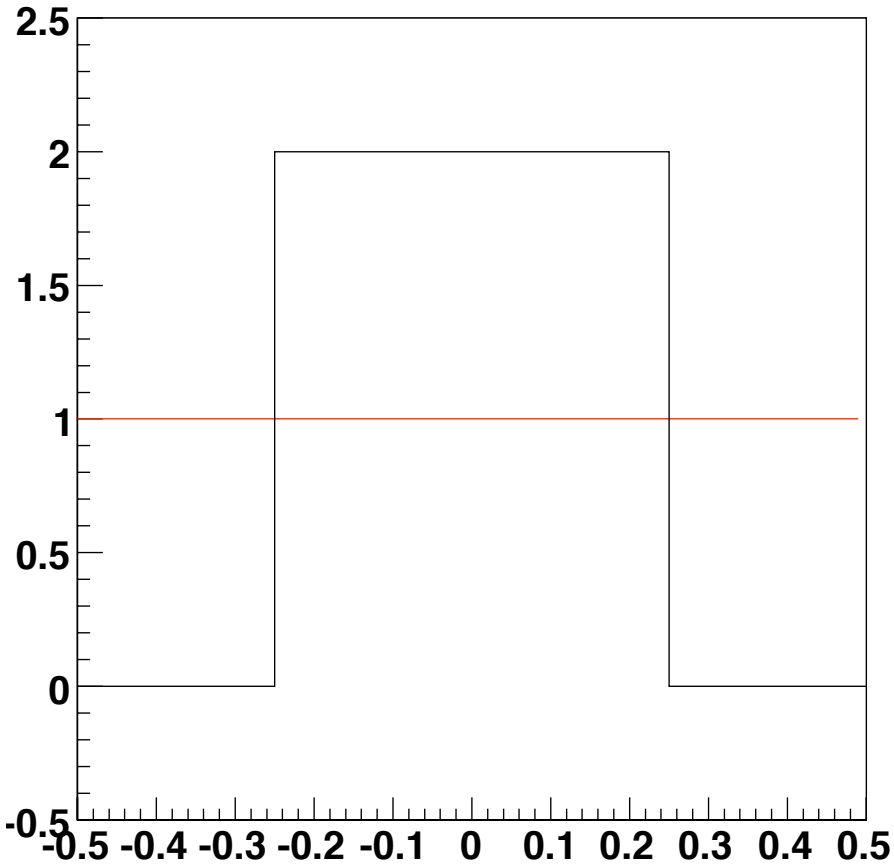
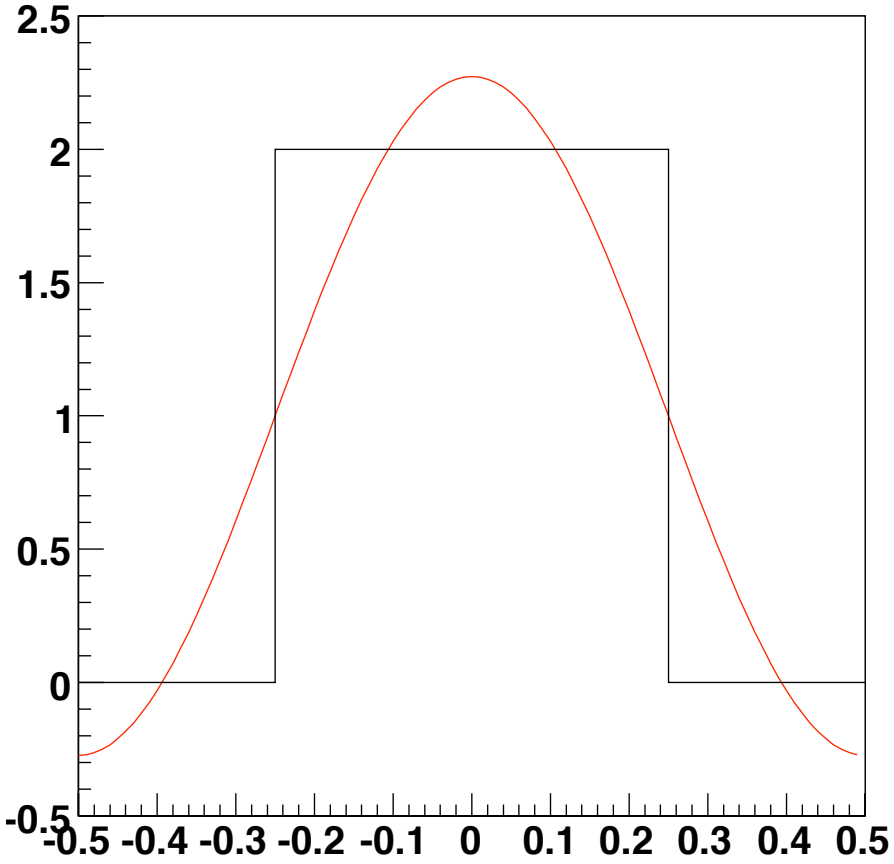
Zero-th Approximation



Approximate function by its average

$$f(x) \simeq 1$$

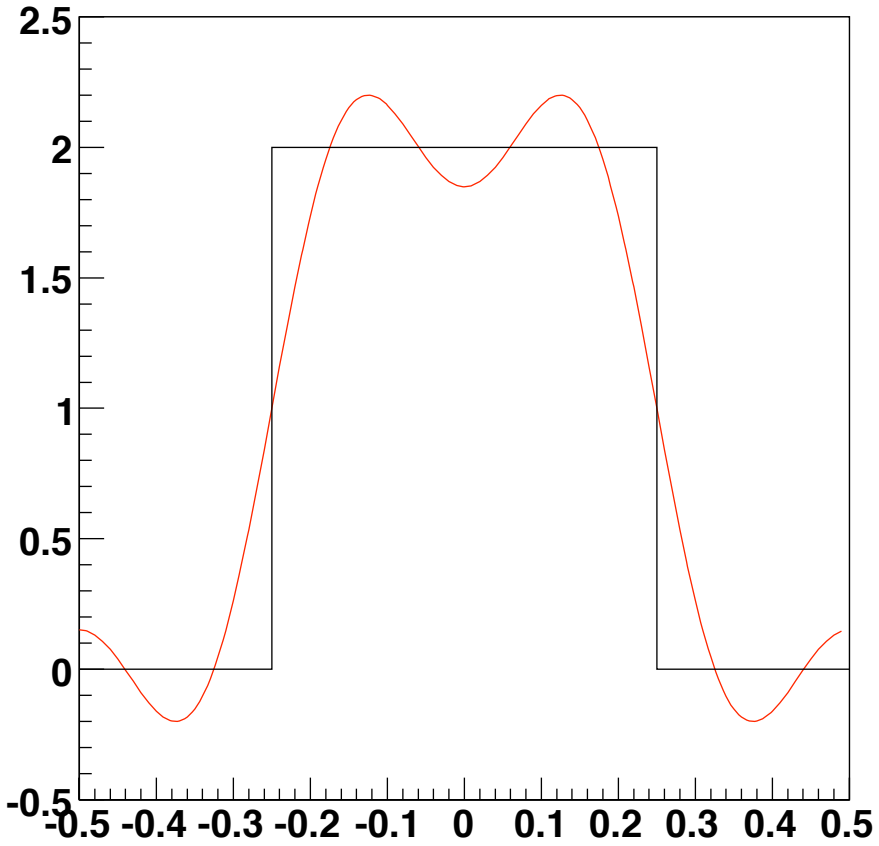
1st Approximation



Approximate function by its average + cos(x)

$$f(x) \simeq 1 + \frac{2}{\pi}\cos(2\pi x)$$

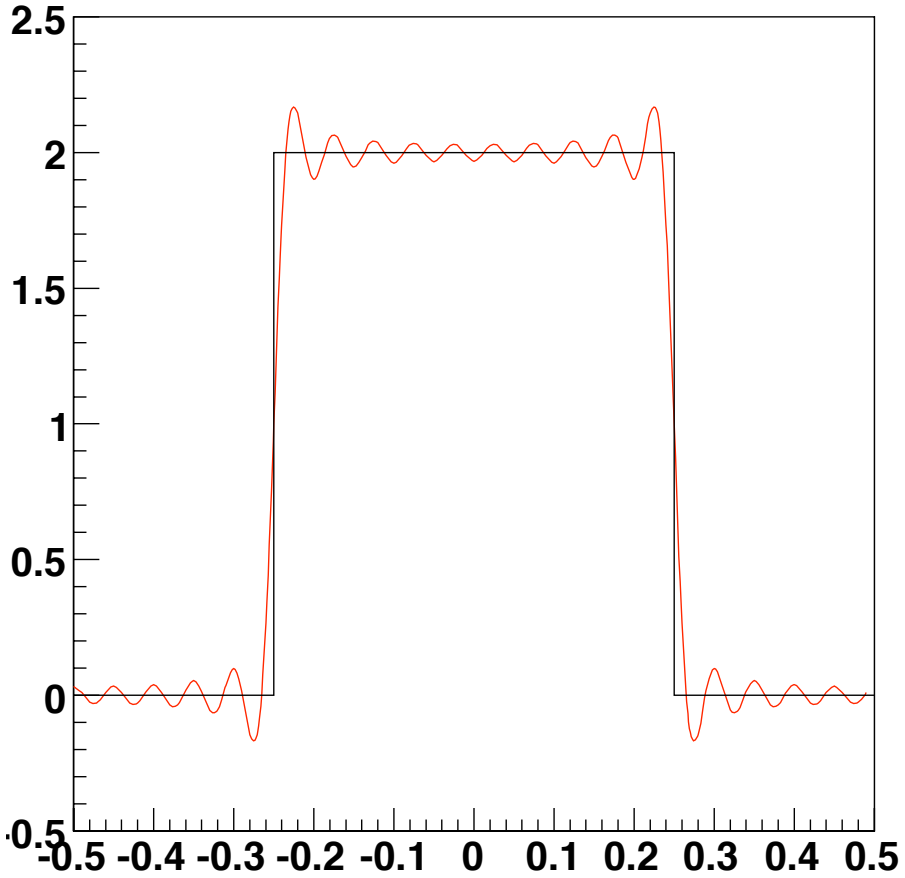
3 term Approximation



Approximate function by its average + cos(x)

$$f(x) \simeq 1 + \frac{2}{\pi}\cos(2\pi x) - \frac{2}{3\pi}\cos(2\pi \cdot 3x)$$

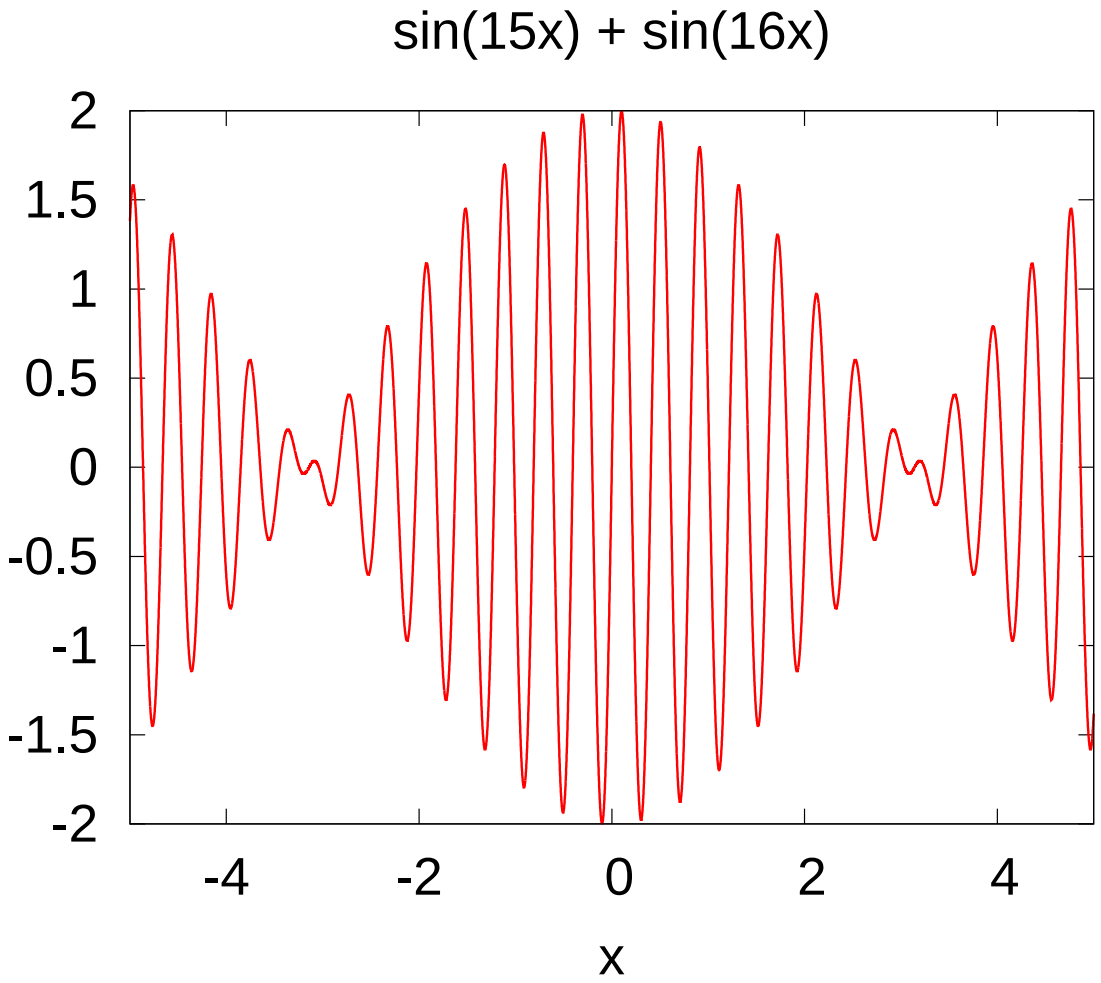
10 term Approximation



Approximate function by its average + cos(x)

$$f(x) \simeq 1 + \frac{2}{\pi}\cos(2\pi x) - \frac{2}{3\pi}\cos(2\pi \cdot 3x) + \frac{2}{5\pi}\cos(2\pi \cdot 5x) + \ldots$$

Adding two sin waves



Adding two waves of similar frequency makes ”beats”

Group velocity – see Michael Fowler's applet