

Fourier Cosine Series and Fourier Sine Series for $f(x)=x$ on $[0,\pi]$

Fourier Cosine Series

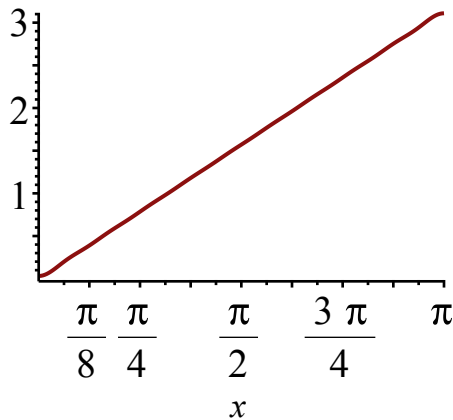
$$f := \frac{\pi}{2} - \text{sum} \left(\frac{4}{\pi \cdot (2 \cdot n - 1)^2} \cdot \cos((2 \cdot n - 1) \cdot x), n = 1 .. 10 \right)$$

$$\frac{1}{2} \pi - \frac{4 \cos(x)}{\pi} - \frac{4}{9} \frac{\cos(3x)}{\pi} - \frac{4}{25} \frac{\cos(5x)}{\pi} - \frac{4}{49} \frac{\cos(7x)}{\pi} - \frac{4}{81} \frac{\cos(9x)}{\pi}$$

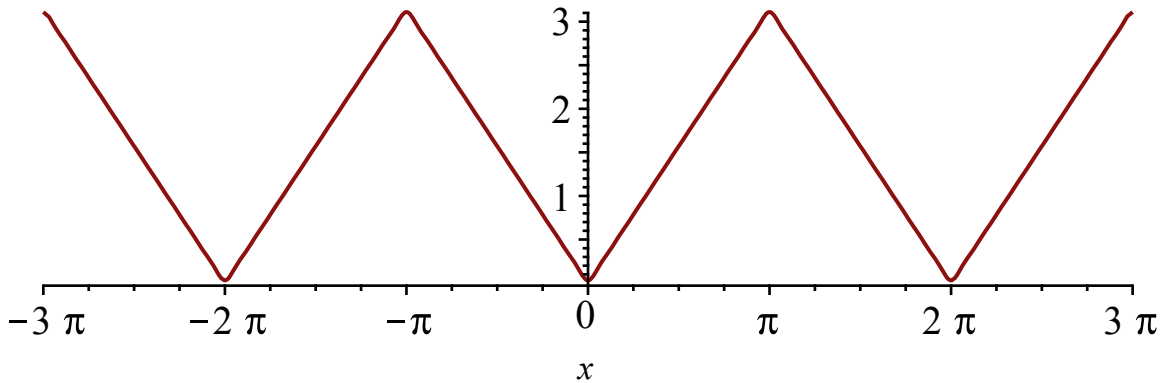
$$- \frac{4}{121} \frac{\cos(11x)}{\pi} - \frac{4}{169} \frac{\cos(13x)}{\pi} - \frac{4}{225} \frac{\cos(15x)}{\pi} - \frac{4}{289} \frac{\cos(17x)}{\pi}$$

$$- \frac{4}{361} \frac{\cos(19x)}{\pi}$$
(1)

$\text{plot}(f, x = 0 .. \pi)$



$\text{plot}(f, x = -3 \cdot \pi .. 3 \cdot \pi)$



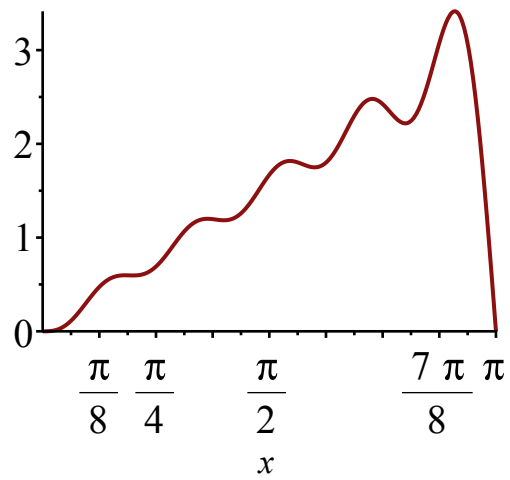
Fourier Sine Series

$$f := 2 \cdot \text{sum} \left(\frac{(-1)^{n+1}}{n} \cdot \sin(n \cdot x), n = 1 .. 10 \right);$$

$$2 \sin(x) - \sin(2x) + \frac{2}{3} \sin(3x) - \frac{1}{2} \sin(4x) + \frac{2}{5} \sin(5x) - \frac{1}{3} \sin(6x) + \frac{2}{7} \sin(7x)$$

$$- \frac{1}{4} \sin(8x) + \frac{2}{9} \sin(9x) - \frac{1}{5} \sin(10x)$$
(2)

$\text{plot}(f, x = 0 .. \pi)$



$$f := 2 \cdot \text{sum} \left(\frac{(-1)^{n+1}}{n} \cdot \sin(n \cdot x), n = 1 \dots 100 \right) : \text{plot}(f, x = -3 \cdot \text{Pi} \dots 3 \cdot \text{Pi});$$

