

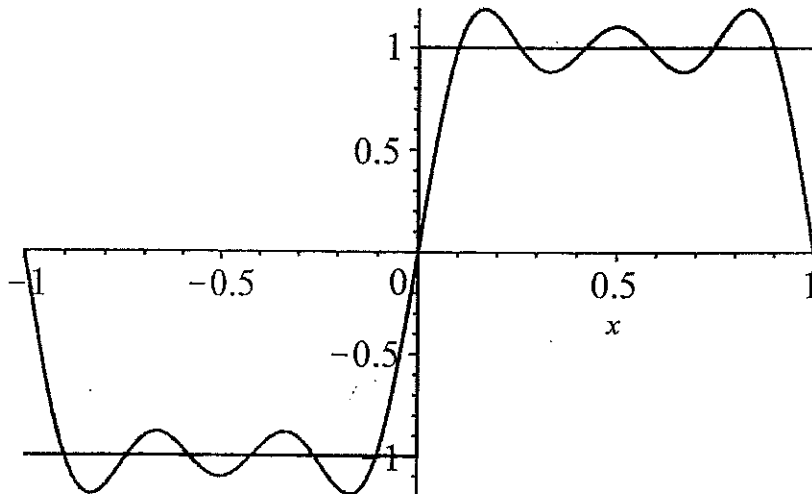
$f1 := \text{piecewise}(-1 \leq x < 0, -1, 0 \leq x \leq 1, 1);$

$$f1 := \begin{cases} -1 & -1 \leq x < 0 \\ 1 & 0 \leq x \leq 1 \end{cases} \quad (1)$$

$g1 := \frac{2}{\text{Pi}} \cdot \text{sum} \left(\frac{(1 - (-1)^n)}{n} \cdot \sin(n \cdot \text{Pi} \cdot x), n = 1..5 \right);$

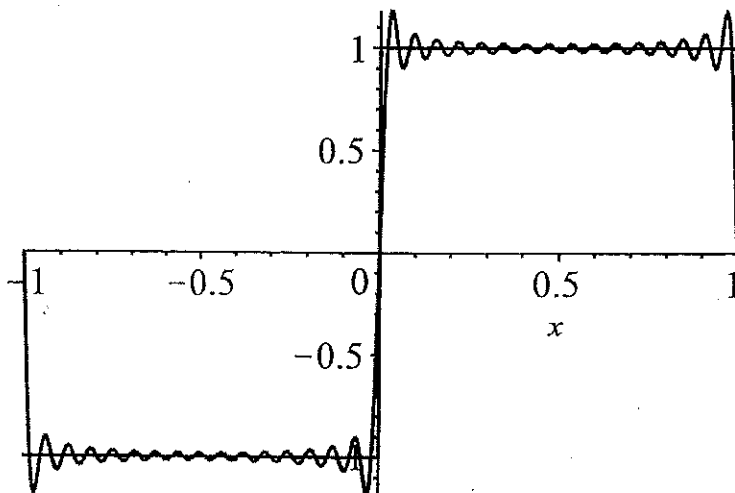
$$g1 := \frac{2 \left(2 \sin(\pi x) + \frac{2 \sin(3 \pi x)}{3} + \frac{2 \sin(5 \pi x)}{5} \right)}{\pi} \quad (2)$$

$\text{plot}(\{f1, g1\}, x = -1..1)$

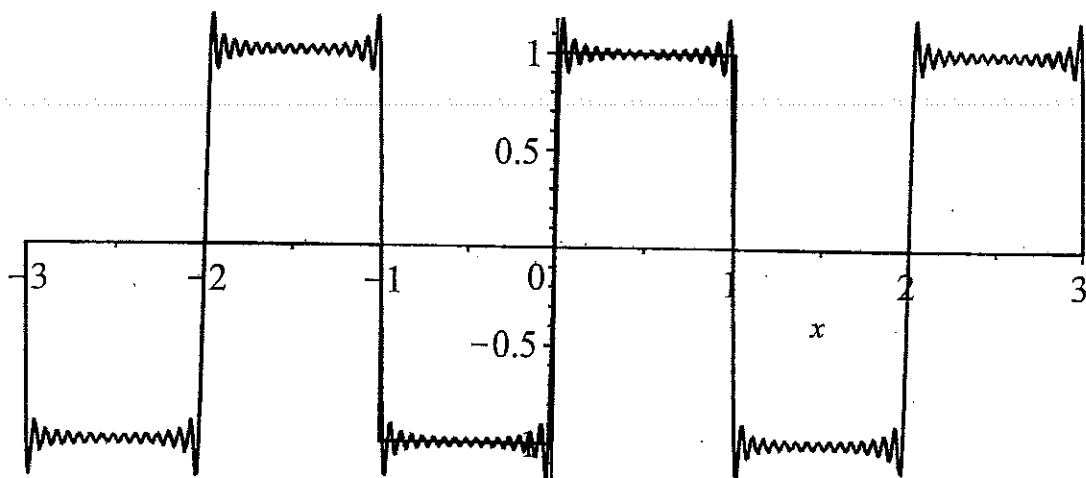


$g2 := \frac{2}{\text{Pi}} \cdot \text{sum} \left(\frac{(1 - (-1)^n)}{n} \cdot \sin(n \cdot \text{Pi} \cdot x), n = 1..31 \right);$

$\text{plot}(\{f1, g2\}, x = -1..1);$



plot({f1, g2}, x=-3..3);

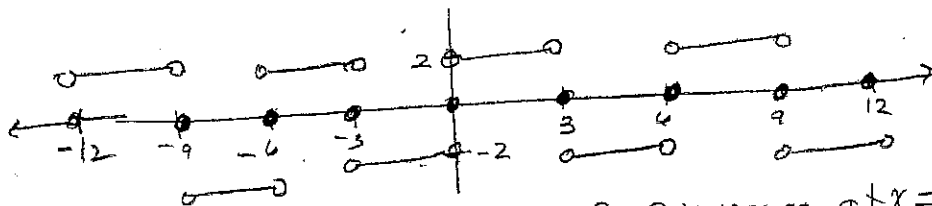


IN CLASS PROBLEMS on Wednesday, September 19, 2018

1. Write the Fourier sine series and Fourier cosine series for $f(x)=2$ on $[0,3]$.
2. To what value does the Fourier sine series converge for $x=0$? $x=4$? $x=-10$?
Graph the Fourier sine series on $[-12,12]$.
3. To what value does the Fourier cosine series converge for $x=0$? $x=4$? $x=-10$?
Graph the Fourier cosine series on $[-12,12]$.

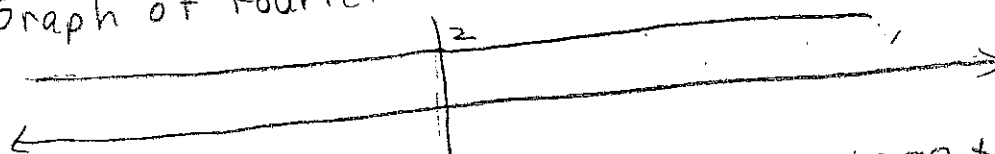
Answers 1. Fourier cosine series: $f(x) = 2 + \sum_{n=1}^{\infty} \frac{4}{n\pi} \overbrace{[\sin(n\pi)]}^0 \cos\left(\frac{n\pi x}{3}\right) = 2$
 Fourier sine series $f(x) = \sum_{n=1}^{\infty} \frac{4}{n\pi} [1 - \cos(n\pi)] \sin\left(\frac{n\pi x}{3}\right)$

2. Graph of Fourier sine series



The Fourier sine series converges at $x=0$ to $\underline{0}$
 at $x=4$ to $\underline{-2}$ at $x=-10$ to $\underline{2}$

3. Graph of Fourier cosine series



The Fourier sine series converges at $x=0$ to $\underline{2}$
 at $x=4$ to $\underline{2}$ and at $x=-10$ to $\underline{2}$