

Correction to 04/22/2009 Lecture

Math 182, Spring 2009

Instructor: Dr. Doreen De Leon

Below is the correction to the first example done in class on April 22, 2009, in which we integrated a function and its Fourier series from a to x , where a is in the interval $[-L, L]$

Given $f(x)$ that is piecewise C^1 on $[-L, L]$.

$$f(x) \sim A_0 + \sum_1^{\infty} A_n \cos\left(\frac{n\pi}{L}x\right) + \sum_1^{\infty} B_n \sin\left(\frac{n\pi}{L}x\right),$$

Choose $a \in [-L, L]$ and integrate from a to x .

$$\begin{aligned} \int_a^x f(x) dx &\sim \int_a^x A_0 dx + \sum_1^{\infty} A_n \int_a^x \cos\left(\frac{n\pi}{L}x\right) dx + \sum_1^{\infty} B_n \int_a^x \sin\left(\frac{n\pi}{L}x\right) dx \\ &\sim A_0(x-a) + \sum_1^{\infty} A_n \frac{L}{n\pi} \left(\sin\left(\frac{n\pi}{L}x\right) - \sin\left(\frac{n\pi}{L}a\right) \right) + \sum_1^{\infty} B_n \frac{L}{n\pi} \left(\cos\left(\frac{n\pi}{L}a\right) - \cos\left(\frac{n\pi}{L}x\right) \right) \end{aligned}$$