

Homework #4: Phys 3320: Prof. Olness Fall 2019

Due XX October 2019

Hint: Use the sample mathematica file posted on the web page:

1) By trial and error, find the coefficients $\{c_0, c_1, c_2, c_3\}$ of the following series,

$$f(x) = c_0 + c_1 \sin(2\pi \cdot 1 \cdot x) + c_2 \sin(2\pi \cdot 2 \cdot x) + c_3 \sin(2\pi \cdot 3 \cdot x)$$

to fit the function

$$f(x)=x$$

on the interval $x=[0,1]$.

Plot your results with the exact function.

2) By trial and error, find the coefficients $\{c_0, c_1, c_2, c_3\}$ of the following series,

$$f(x) = c_0 + c_1 \sin(2\pi \cdot 1 \cdot x) + c_2 \sin(2\pi \cdot 2 \cdot x) + c_3 \sin(2\pi \cdot 3 \cdot x)$$

to fit the function

$$f(x)=0 \text{ for } x=[0,1/2] \text{ and } f(x)=1 \text{ for } x=[1/2,1]$$

on the interval $x=[0,1]$.

Plot your results with the exact function.

3) By trial and error, find the coefficients $\{c_0, c_1, c_2, c_3\}$ of the following series,

$$f(x) = c_0 + c_1 \sin(2\pi \cdot 1 \cdot x) + c_2 \sin(2\pi \cdot 2 \cdot x) + c_3 \sin(2\pi \cdot 3 \cdot x)$$

to fit the function

$$f(x)=1 - |x|$$

on the interval $x=[-1,1]$. ($|x|$ is the Abs(x).)

Plot your results with the exact function.

Comment on your answer.