Worksheet 23

Sections 207 and 219
MATH 54

April 25, 2019

Exercise 1. Are the following functions even, odd, or neither?

(a) $f(x) = \sin^2(x)$

(b) $f(x) = \sin(x + 1)$

(c) $f(x) = x^{1/5}\cos(x^2)$

(d) Why can it be helpful to know when a function is even or odd? Name a specific example in which using this can ease computation.

Exercise 2. Compute the fourier series for the given function on the specified interval. On your own time, use a computer to plot a few partial sums of the Fourier series.

$$f(x) = x, -\pi < x < \pi$$

Exercise 3. The norm of a function, $||f|| = \sqrt{\langle f, f\rangle}$ is like the length of a vector in $\mathbb{R}^n$. In particular, show that this norm satisfies the following properties associated with length:

1. $||f|| \geq 0$, and $||f|| = 0$ if and only if $f = 0$.
2. $||cf|| = |c|||f||$, where c is any real number.
3. $||f + g|| \leq ||f|| + ||g||$