

## Homework Assignment # 3

**Exercises:** Strauss pp 107–109: 2, 4, pp 113–114: 3, 8, 10a,b.

1. (a) Sketch the  $2\pi$ -periodic half wave  $f(x) = \begin{cases} \sin x, & 0 < x \leq \pi, \\ 0, & -\pi \leq x < 0. \end{cases}$   
(b) Find its Fourier series. (c) Graph the first 5 Fourier sums and compare with the function. (d) Discuss convergence of the Fourier series.

2. Find the Fourier series and discuss convergence for the box function

$$b(x) = \begin{cases} 1, & |x| < \frac{1}{2}\pi, \\ 0, & \frac{1}{2}\pi < |x| < \pi, \end{cases}$$

3. Prove that (a) the sum of two even functions is even; (b) the sum of two odd functions is odd; (c) *every* function is the sum of an even and an odd function.

**Due:** Tuesday, October 12

**Text:** Walter A. Strauss, *Partial Differential Equations: an Introduction*, John Wiley & Sons, New York, 1992.

**First Midterm:** Thursday, October 28

Will cover sections 1.2, 2.1, 2.2, 3.2, chapter 5.

You will be allowed to use one 8" × 11" sheet of notes.