

# Assignments Week 4 SF2705 Fourieranalysis.

These are the things that you are expected to do before the Lecture on the **18th of February**.

**1 Reading:** Read the following in Stein-Shakarichi

- We are a little off my plan. Next week we will begin to discuss pp. 81-87 and then continue with Chapter 3.1 pp. 69-81.

**2 Discussion questions.**

1. [REPEATED FROM LAST WEEK.] Assuming that (which we will show soon)  $S_N(f)(x) \not\rightarrow f(x)$ . Why does it make sense to introduce mean square convergence  $\|S_N(f) - f\| \rightarrow 0$ ?

Something very deep is going on here as well. We change the concept of convergence from point-wise convergence to convergence in a new way where we consider the function  $f(x)$  as an object in a vector (Hilbert) space.

2. What is the difference and similarities between a Hilbert space and a normal finite dimensional vector-space as constructed in linear algebra?
3. Does the diverging Fourier series constructed in section 2.2,  $S_N(f)(0)$ , have any convergent sub-sequences?
4. Try to summarize what you know about the point-wise convergence of Fourier series.

**3 Problems to consider:** Solve **12, 13, 15, 16** and **19** in chapter 2.

**4. Assignments for the 18th of February:**

**Assignment 1:** Carefully do Exercise 17 on p. 63 in Stein-Shakarchi. Hand it in on February 18th.

**5 Office hours:** I will have office hours in my office on level 7 in the mathematics building on Friday the 14th of February 10-11am in case you have any questions.