Assignments Week 15 SF2705 Fourieranalysis.

These are the things that you are expected to do before the Lecture on the **20th of May**.

1 Reading: Read Chapter 7.2 pp. 226-236.

2 Discussion questions.

1. In defining the Fourier transform on a finite group G we define many different structures on G: its characters, the linear operators T_a and we consider the vectorspace V of functions on G. How does these structures interact and how are they related to each other?

2. Take 30 minutes and try to "sort out" the proof of Theorem 2.5. How could anyone have come up with this proof? What kind of thinking did lead to the rather intricate web of ideas. We can all memorize a proof (and it is even easier to forget it once memorized), but can you make sense of it and make it your won?

3 Problems to consider: Do **2, 4, 5, 11** and **13** in Stein-Shakarchi pp. 236-239.

4. Assignment for the 20th of May: This will be the final assignment of the course! It is therefore appropriate to try to summarize the course. Pick three things from the course and write $\frac{1}{2} - 1$ page about each. It might be applications (the Radon transform, solutions to the Heat/Wave equation etc.), it might be techniques (convolution operators, changing summation to integration against a kernel etc.), it might be the interaction of algebra and analysis (Hilbert spaces or the interaction of group theory and Fourier analysis) or anything else that you think is interesting.

I want you to very briefly explain the mathematical idea and why you have found it to be interesting. You should thus choose the three things with care and preferably go browse through the book and look at all chapters before choosing your topics (In case you wonder: Yes, this assignment is partially here to force you to repeat the course).

5 Office hours: It does not seem to be any need for office hours. In case you have any pressing question please write me an email (johnan@kth.se) and we can book a time on Friday.