

HARMONIC ANALYSIS OF MEASURES

7,5 HP

1. COURSE DESCRIPTION

While it is possible to define Fourier transform for a measure defined on a topological group (which generalizes the Fourier transform defined on \mathbb{R} , or \mathbb{T}), and the resulting function is uniformly continuous bounded function on the dual group, there is still no clear way to say if a function is a Fourier transform or not. We will study the problem of connecting properties of functions on the dual group, with the properties of measures whose Fourier transform they may be, giving particular attention to the asymptotic behavior at infinity.

In the first part of the course we will study the "local" behavior of the Fourier transform, dividing the Banach space of measures in more manageable "slices", and in the second part we will connect those behaviors to the global study of algebra of measures.

2. AIM OF THE COURSE

During the course the students will learn how methods of Topology and Functional Analysis can be applied to the study of Fourier transforms. We will study some basic concepts of Harmonic Analysis, such as Rajchman, Sidon and interpolation sets. We will also work with particular classes of measures, such as idempotent, quasi-idempotent, and semi-idempotent measures, but also consider the constructive class of Riesz products.

3. DURATION

The course will consist of one or two lectures a week, during lp1 and lp2.

4. PREREQUISITES

Algebraical Structures, Integration theory, Functional Analysis, Topology

5. LECTURER AND COURSE ORGANIZER

Maria Roginskaya: maria.roginskaya@chalmers.se

6. LECTURES AND EXAMINATION

The course will have lectures once or twice a week. Lecture notes in English will be provided to participants. Examination will consist of written assignments during the course, and oral examination at the end of the course.

7. LITERATURE

The course will closely follow the first part of "Analyse Harmonique des mesures" by B. Host, J.-F. Méla, and F. Parreau

Some reference will be made to "Fourier Analysis on groups" by W. Rudin and "Essays in Commutative Harmonic Analysis" by C.C. Graham, and O.C. McGehee

8. REGISTRATION

For registration, please, send e-mail to maria.roginskaya@chalmers.se