

MATH-696

The Fourier transform in algorithms and optimization (2018)

Eisenbrand Friedrich

Cursus	Sem.	Type
Mathematics		Obl.

Language of teaching	English
Credits	2
Session	
Exam	Oral
Workload	60h
Hours	24
Courses	12
TP	12
Number of positions	10

Remark

Next time: From 1.10.2018 to 9.11.2018

Summary

This course deals with applications of Fourier analysis in algorithms and optimization. We will discuss the following themes: finite setting, Fourier transform, convolution, KLL theorem. classical Fourier transform with proof of the strongest transference bounds for lattice free convex bodies.

Content

This course is on applications of Fourier analysis in algorithms and optimization. We start with the finite setting, the Fourier transform, and applications like Linearity Testing and Roth's theorem. Then we discuss convolution and the KLL theorem. We continue with the classical Fourier transform and prove the, up to now, strongest transference bounds for lattice free convex bodies. The course ends with the discussion of very new contributions, like the Hoberg-Rothvoss theorem on the discrepancy of random set systems.

Note

This course will be in the form of a seminar. Each participant is expected to give a talk, and to propose exercises. Furthermore, each participant is expected to solve and present the exercises that are presented by the speakers.

Learning Prerequisites**Required courses**

Basic knowledge in linear algebra and optimization