Winter School on Geometric and Harmonic Analysis

February 17-19, 2025, Chemnitz

Organizers

- Sebastian Boldt
- Batu Güneysu

Invited Speakers

- Diego Pallara
- Felix Pogorzelski
- Marcel Schmidt

Diego Pallara - An introduction to infinite dimensional analysis

In this lecture series the basic notions of Malliavin calculus in infinite dimensional separable Banach or Hilbert spaces endowed with a Gaussian measure are presented. This theory can be regarded as an infinite dimensional variant of Sobolev spaces. The Ornstein-Uhlenbeck semigroup and its generator will be discussed, together with the main properties of Sobolev spaces and the space of BV functions.

Marcel Schmidt - Spectral theory v.s. metric geometry on Riemannian manifolds

This lecture series gives an introduction on the interplay between the metric geometry and the spectral theory of the Laplace-Beltrami operator on a Riemannian manifold. Self-adjoint realizations of the Laplacian are discussed, as well as bounds for the bottom of its spectrum, and some spectral theory on L^∞, with the latter being related to global properties of Brownian motion. The involved methods are so robust that they generalize to large classes of less smooth spaces (e.g. metric measure spaces and discrete graphs).

Felix Pogorzelski - On sofic groups, local empirical convergence and spectral approximation

The notion of local empirical convergence (le-convergence) towards invariant measures on configuration spaces has been defined by Austin for a study on entropy for measure preserving actions of sofic groups. As it turns out, le-convergence is also a useful concept in aspects of spectral convergence for certain discrete random operators. The goal of the lecture series is to explain this connection for random Schrödinger type operators on sofic Cayley graphs. We demonstrate how to prove a probabilistic uniform approximation theorem for the integrated density of states via eigenvalue counting functions on finite-volume analogs. A special focus will be on periodically approximable groups (PA-groups), for which le-convergent approximations always exist.

Description of the Winter School

The winter school “geometric and harmonic analysis” will take place at the main campus of the Technical University of Chemnitz. It aims at PhD students and early phase PostDocs, with a basic knowledge of functional analysis. Each invited speaker will give a series of three lectures. Some selected participants will be given the opportunity to present their research in short talks.
In case you intend to participate, please send an e-mail to batu.gueneysu@mathematik.tu-chemnitz.de or sebastian.boldt@mathematik.tu-chemnitz.de (and submit an abstract, in case you are interested to give a short talk).