

Mini-course “Introduction to the spectral theory of the fractals”

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Lecture 1. Self-similar fractals (Sierpinski gasket, finite or infinite, quantum self-similar graphs, Dyson’s hierarchical lattice L_h).

Lecture 2. Hierarchical lattice L_h and hierarchical Laplacian Δ_h as the example of the “typical” fractal structure of the spectrum of Δ_h and corresponding eigenvalues. Spectral dimension.

Lecture 3. Random walk on L_h , transition probabilities, applications of Lieb methods to the spectrum of the Schrödinger type operator $H = \Delta_h + V(x), V \geq 0$.

Lecture 4. Laplace operator and Dirichlet form on the infinite Sierpinski gasket. Their lattice approximation. Structure of the spectrum and eigenfunctions. Limit theorems for random walk on the Sierpinski lattice.