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LAPLACIANS ON THE SIERPINSKI GASKET WITH TWISTS

Baris E Ugurcan

Cornell University [Mentor: Robert Strichartz]

Abstract of Report Talk: Kigami has shown how to define analogs of the Laplacian on a class of fractals that includes the familiar Sierpinski Gasket (SG). Actually, his method allows the construction of many different self-similar Laplacians. By introducing twists (reflections) in the mappings that define SG, Cucuringu and Strichartz last summer showed how to construct geometric models, self-similar fractals that are topologically equivalent to SG but geometrically distinct, allowing different contraction ratios on different cells. However, it is not clear what relationship, if any, exists between the geometric models and self-similar Laplacians. Our work (joint with Strichartz and undergraduate student Anna Blasiak) investigates this connection by computing the spectrum of Laplacians on SG and also the spectrum of the ordinary 2-dimensional Laplacian on an outer approximation of the geometric models. The method of outer approximation first studied last summer by Berry and Strichartz, requires finding a region with connected interior to approximate the fractal, and then using the finite element method solver in Matlab to find the Neumann spectrum of the Laplacian on the region. We are looking for similarities in the two types of spectra to make a plausible connection. [UB13151859]

[Joint work with Robert Strichartz and undergraduate student Anna Blasiak]

Contact: ugurcan@ug.bilkent.edu.tr

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