Spring Colloquium Series

Laplace operators in fractal geometry - An introduction to analysis on fractals

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Abstract:

In nature we find various examples of objects that are not as smooth as mathematicians would like them to be. Snowflakes, fern leaves and coastlines are classical examples of highly non-smooth objects occurring in everyday life. Objects like these are studied in Fractal Geometry and in order to develop an analogue to the classical calculus, we need to formulate a theory of analysis on fractals.

The natural starting point for a calculus on fractals is the construction of an operator corresponding to the Laplacian. This will not be a genuine differential operator, but it will have some properties of the classical Laplace operator. There are different ways of constructing Laplacians on fractals and in this talk we will mainly focus on two of them. In the measure-geometric approach we will embed the fractal in an appropriate Euclidean space and decode the fractal structure in a measure. The second approach uses approximations of the fractal and represents the Laplacian as the limit of normalized difference operators.

Wednesday, May 25, 1:00 - 1:50pm in 3-1639