Meeting: 1001, Evanston, Illinois, SS 12A, Special Session on Iterated Function Systems and Analysis on Fractals

1001-28-61 **Michel L. Lapidus*** (lapidus@math.ucr.edu), Department of Mathematics, Surge Bdg., University of California, Riverside, CA 92521-0135, and **Erin P. J. Pearse**. *Complex Dimensions of Self-Similar Fractals: One-Dimensional Theory and the Example of the Koch Snowflake Curve in Two Dimensions.*

In the first part of this talk, we will give a brief overview of some of the results of the presenter (MLL) and Machiel van Frankenhuysen (MvF) on the mathematical theory of complex fractal dimensions of self-similar fractal strings (i.e., of self-similar sets in one dimension). [See, e.g., the forthcoming second edition of the research monograph by MLL and MvF, "Fractal Geometry and Number Theory" (Birkhauser, Boston, 2005, approx. 390pp.).]

In the second part of this talk (that should be given by the second author of the present abstract, EPJ), we begin to discuss in an example elements of a two-dimensional theory of complex dimensions. Namely, in a recent work by the presenter and Erin Pearse, we obtain an explicit formula for the interior epsilon-neighborhood of the Koch snowflake curve. (This formula agrees with earlier predictions made in the last chapter of the first edition of the above monograph by MLL and MvF, but is also much more precise.) The coefficients of the resulting expansion are expressed in terms of the Fourier coefficents of a Fourier series of a suitable nonlinear analogue of the classical Cantor staircase function. We deduce from this result the potential complex dimensions of the Koch curve as well as its non-Minkowski measurability. (Received August 01, 2004)