Effective Multifractal Analysis

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Multifractal measures play an important role in the study of point processes and strange attractors. A central component of the theory is the multifractal formalism, which connects local properties of a measure (pointwise dimensions) with its global properties (average scaling behavior).

In this talk I will introduce a new, effective multifractal spectrum, where we replace pointwise dimension by asymptotic compression ratio. It turns out that the underlying measure can be seen as a universal object for the multifractal analysis of computable measures. The multifractal spectrum of a computable measure can be expressed as a"deficiency of multifractality" spectrum with respect to the universal measure. This in turn allows for developing a quantitative theory of dimension estimators based on Kolmogorov complexity. I will discuss some applications to seismological dynamics.