

Sascha Troscheit. A localised measurement of complexity for self-similar attractors.

Abstract. A self-similar attractor of an iterated function system (IFS) is the invariant set F under a finite collection $\mathbb{I} = \{f_1, \dots, f_N\}$ of contracting similitudes $f_i : \mathbb{R}^d \rightarrow \mathbb{R}^d$,

$$F = \bigcup_{f \in \mathbb{I}} f(F).$$

We shall explore the connection between the attractor of such an IFS and the Assouad dimension, an indicator of maximal relative ‘complexity’. Number theoretic arguments on the contraction rates lead to the Assouad dimension taking maximal values, which in turn give lower bounds on embeddability by bi-Lipschitz maps. We will show that in a ‘nice’ random setting the Assouad dimension takes the value akin to the joint spectral radius of an associated matrix under a suitable norm and we consider the case of sets satisfying (and not satisfying) the weak separation property (WSP).
