

Dimensions of projected sets and measures on self-affine sets

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Abstract: Let $\{\phi_i(x) = T_i x + a_i\}_{i=1}^\ell$ be an iterated function system on \mathbb{R}^d consisting of contractive affine maps, and $\pi : \{1, \dots, \ell\}^{\mathbb{N}} \rightarrow \mathbb{R}^d$ the corresponding coding map. Under an additional assumption that $\|T_i\| < 1/2$, for any given Borel set E and Borel probability measure μ in the coding space, we determine the various dimensions of their projections under π for typical translations (a_1, \dots, a_ℓ) ; in particular, we give a necessary and sufficient condition on μ so that the typical projection of μ is exactly dimensional. This extends the known results in the literature on typical projections of invariant sets and invariant measures. It plays an analogue to the (orthogonal) projection theorems of Hausdorff and packing dimensions. Further results are obtained for deterministic planar self-affine sets. The talk is partially based on joint work with Chiu-Hong Lo.