Rapid Fluctuations of Chaotic Maps on $\mathbb{R}^N$

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The iterates f^n of a chaotic map f display heightened oscillations (or, fluctuations) as $n \to \infty$. If f is a chaotic interval map in one-dimension, then it is now known that the total variation of f^n on that interval grows exponentially with respect to n [15]. However, the characterization of chaotic behavior of maps in multidimensional spaces is generally much more challenging. Here, we generalize the definition of bounded variations for vector-valued maps in terms of the Hausdorff measure and then use it to study what we call *rapid fluctuations* on fractal sets in multidimensional chaotic discrete dynamical systems. The relations among rapid fluctuations, strict turbulence and positive entropy are established for Lipschitz continuous systems on general $N-$dimensional Euclidean spaces. Applications to planar monotone or competitive systems, and triangular systems on the square are also given. This talk is based on a joint paper by Y. Huang, G. Chen and D. Ma.