Title: Higher order local dimensions and Baire category

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Abstract

We show that the local dimension of a typical (in the sense of Baire) measure fails to exist in a very spectacular way. Namely, the "local dimension function" of a typical measure remains divergent even after being "smoothened out" by very general averaging methods, including, for example, higher order Riesz-Hardy logarithmic averages and Cesaro averages. This shows that the "local dimension function" of a typical measure diverges in the worst possible way.