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Stephane P Jaffard* (jaffard@u-pec.fr). *New exponents for multifractal analysis.*

The purpose of the multifractal analysis of a function f is to determine the Hausdorff dimensions of the sets of points where a pointwise regularity exponent $h_f(x)$ takes a given value. The corresponding collection of dimensions is referred to as the multifractal spectrum. In applications, It is estimated through a Legendre transform of averaged quantities, computable on data. Multifractal analysis developed in the setting where the exponent is the Hölder exponent; this only applies to locally bounded functions, an a priori hypothesis which is seldom met in real-life.

We will present an alternative, where the pointwise Hölder regularity is the T_α^p regularity introduced by Calderón and Zygmund. The a priori assumption is that the data locally belong to L^p . We will set the mathematical framework supplied by this p -exponent based multifractal analysis, extend it to $p < 1$ and show that comparing the informations supplied by different values of p allows to infer additional knowledge on the nature of the singularities. We give applications to stochastic processes, random fields and real-life data.

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