The Einstein Relation on Metric Measure Spaces

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Many physical phenomena proceed in or on irregular objects which are often modeled by fractal sets. Using the model case of the Sierpinski gasket, we introduce the notions of Hausdorff, spectral and walk dimension. These characteristic numbers of the fractal are essential for the Einstein relation, expressing the interaction of geometric, analytic and stochastic aspects of a set. These results can be found in the survey paper [2].
If time allows, we then review the Einstein relation in the abstract setting of a metric measure space equipped with a suitable operator. This requires some twists compared to the usual definitions from fractal geometry. The main result establishes the invariance of the three involved notions of fractal dimension under bi-Lipschitz continuous isomorphisms between mm-spaces and explains, more generally, how the transport of the analytic and stochastic structure behind the Einstein relation works. The second part of the talk is based on a joint work with Fabian Burghart (Uppsala University, Sweden), see [1].

References

[1] Fabian Burghart and Uta Freiberg. *The Einstein Relation on Metric Measure Spaces*. 2019. arXiv: 1903.07166 [math.FA].

[2] Uta Renata Freiberg. "Einstein relation on fractal objects". English. In: *Discrete Contin. Dyn. Syst., Ser. B* 17.2 (2012), pp. 509–525. ISSN: 1531-3492. DOI: 10.3934/dcdsb.2012.17.509.