

# The return trip to classical fractal theory from effective fractal dimension

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## Abstract

J. Lutz and N. Lutz (2017) have recently proven a point-to-set principle for Euclidean and Cantor spaces. This result is a characterization of classical Hausdorff dimension in terms of relativized effective dimension. This implies that geometric measure results regarding Hausdorff dimension can be shown using only effective methods. Several interesting classical results have already been proven using this principle.

In this talk I will present the point-to-set principle in Euclidean space and explain in detail how a Kolmogorov complexity proof (N. Lutz 2017) improves a well known classical result.

Next I will generalize this approach to any separable metric space and show examples of Information theory proofs of fractal dimension results in these spaces.

## References

- [1] J. H. Lutz and N. Lutz. Algorithmic information, plane Kakeya sets, and conditional dimension. *ACM Transactions on Computation Theory*. To appear.
- [2] N. Lutz. Fractal intersections and products via algorithmic dimension. In *International Symposium on Mathematical Foundations of Computer Science (MFCS)*, 2017.

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