

EFFECTIVE FRACTAL DIMENSIONS*

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ABSTRACT. This tutorial will give a unified overview of the theory and applications of effective fractal dimensions, covering the work of many investigators since 2000. The presentation will be in three parts.

- (1) Overview of classical Hausdorff, packing, and Billingsley dimensions. Systematic approach to effectivizing dimensions. Constructive dimensions in sequence spaces and their relations with randomness and information theory.
- (2) Dimensions of individual points in Euclidean spaces. Applications in geometric measure theory, including self-similar fractals, random fractals, and rectifiable curves.
- (3) Polynomial-time and finite-state fractal dimensions. Applications in computational complexity, information theory, prediction, and data compression.

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