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Fractal-like integer sets coming from dynamics

ABSTRACT.

For a recurrent ergodic infinite measure transformation, return times to a subset of finite measure have density zero, by the Ergodic Theorem. Nevertheless, these sparse integer sets may exhibit interesting geometry, imitating fractal sets of the reals, and leading to an order-two ergodic theorem. We survey two very different types of examples, the first related to renewal transformations, and the second to adic transformations. We describe the relationship to a third type of example: horocycle flows on an infinite area Riemann surface. (Joint work with Marina Talet.)