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Random walks on barycentric subdivisions and the Strichartz hexacarpet

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We investigate the relation between simple random walks on repeated barycentric subdivisions of a triangle and a self-similar fractal, Strichartz hexacarpet, which we introduce. We explore a graph approximation to the hexacarpet in order to establish a graph isomorphism between the hexacarpet approximations and Barycentric subdivisions of the triangle, and discuss various numerical calculations performed on the these graphs. We prove that equilateral barycentric subdivisions converge to a self-similar geodesic metric space of dimension log(6)/log(2), or about 2.58. Our numerical experiments give evidence to a conjecture that the simple random walks on the equilateral barycentric subdivisions converge to a continuous diffusion process on the Strichartz hexacarpet corresponding to a different spectral dimension (estimated numerically to be about 1.74).

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