Fractal diffusion coefficient from dynamical zeta functions

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Abstract. Dynamical zeta functions provide a powerful method to analyze low-dimensional dynamical systems when the underlying symbolic dynamics is under control. On the other hand even simple one-dimensional maps can show an intricate structure of the grammar rules that may lead to a non-smooth dependence of global observables on parameters changes. A paradigmatic example is the fractal diffusion coefficient arising in a simple piecewise linear one-dimensional map of the real line. Using the Baladi-Ruelle generalization of the Milnor-Thurnston kneading determinant we provide the exact dynamical zeta function for such a map and compute the diffusion coefficient from its smallest zero.