THE SCALING LIMIT OF A LOOP-ERASED RANDOM WALK ON THE SIERPINSKI GASKET

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We study a model of loop-erased random walk on the finite pre-Sierpinski gasket which permits exact analysis. We prove the existence of the scaling limit. We also prove that the path of the limiting process is almost surely self-avoiding but that the Hausdorff dimension of the path takes almost surely a certain value greater than 1. This result means that the path has infinitely fine creases, while having no self-intersection. This value of Hausdorff dimension is consistent with the displacement exponent obtained by Shinoda from the study of uniform spanning trees on the pre-Sierpinski gasket. We previously studied a self-avoiding walk on the pre-Sierpinski gasket, which corresponds to the uniform measure on self-avoiding paths of a given length, and studied the scaling limit. On the other hand, Lawler defined loop-erased random walk on square lattices, which is defined by erasing the loops from a simple random walk chronologically. We constructed a counterpart on the Sierpinski gasket. It is self-avoiding, but we show that our process belongs to a different universality class from the self-avoiding walk with uniform measure.