SIMPLE GEODESIC ON HYPERBOLIC PUNCTURED TORUS

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Let T be a complete finite area complete hyperbolic punctured torus. A geodesics on T is called simple if it has no transverse self-intersection (therefore it is either an embedded copy of $\mathbb{R}$ or an embedded circle). McShane studied simple geodesics that exit a given cusp of T and showed that they naturally correspond to a cantor set union some isolated points. He shows further that every open set complementary to the Cantor set contains exactly one isolated point and a simple geodesic corresponds to such point if and only if it returns to the cusp.

In this talk, after explaining the details of this theorem we will give a very simple proof of it, that in addition shows that the set of simple cuspidal geodesics is independent of the metric: given two hyperbolic tori T_1 and T_2 there is a homeomorphism between a neighborhood of the cusp of T_1 and a neighborhood of the cusp of T_2 that takes segment of simple geodesics on T_1 to segments of simple geodesics on T_2.

Time permitting we will say a word about generalizing this work to all complete hyperbolic surfaces.

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