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Title: Loop products, closed geodesics and self-intersections

Abstract:

A metric on a compact manifold M gives rise to a length function on the space of maps of the circle into M , the free loop space LM , whose critical points are the closed geodesics on M in the given metric. Morse theory gives a link between Hamiltonian dynamics and the topology of loop spaces, relating iteration of closed geodesics and the algebraic structure given by the Chas-Sullivan product and loop coproduct on the homology of LM .

We have simplified, chain-level definitions for the "loop" product and coproduct. The new definitions make possible new links between geometry and loop products. For example, If the k -fold coproduct of a homology class X on LM is nontrivial, then every representative of X contains a loop with a $(k+1)$ -fold self-intersection.

The talk will emphasize geometric motivation and examples. No knowledge of loop products or string topology will be assumed.

Joint work with Nathalie Wahl.