Riemannian Groupoids and Geodesics

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Abstract

I will discuss Morita invariant properties of Riemannian groupoids, as a way to perform Riemannian geometry on singular spaces, based on a work in progress with M. del Hoyo. We use generalized curves of groupoids to model smooth curves on stacks, induce a metric lenght structure on the orbit space of proper groupoids, and introduce a definition for geodesics on stacks. Our definition extends and organizes previous definitions for geodesics on orbifolds and orbit spaces of isometric actions. We set several foundational results, such as existence and uniqueness of geodesics, and a stacky Gauss Lemma. Our main result is a stacky version of Hopf-Rinow theorem. I will explain the basics, describe the main ideas behind the proofs, and point some lines for future research.