One-dimensional geodesic spaces, Part I: Structure theory

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We present several results on the structure of geodesic length spaces of topological dimension one, with a focus on results describing the structure of homotopy classes of paths and loops. We prove structure theorems for geodesics, i.e. curves which minimize length within their homotopy class, and use these to prove theorems about the structure of the π_1-hull of the space, which we define as the union of all geodesic loops in the space. One application of these results to marked length spectrum rigidity will be presented in the talk "One-dimensional geodesic spaces, Part II: Marked length rigidity" by David Constantine, also in this session.