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6. Topology

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The fundamentals of Lipschitz and quasiconformal manifolds

Call a homeomorphism of open sets in Euclidean spaces LIP or LQS if locally it is bi-Lipschitz or, respectively, quasisymmetric (equivalently quasiconformal). For CAT = LIP or LQS, define CAT manifold theory concepts with the aid of atlases. We present two fundamental results on CAT manifolds, generalizing work of D. Sullivan. Exclude boundaries, for simplicity, and dimension 4, of necessity. First, a closed locally flat topological manifold pair admits a locally CAT flat CAT manifold pair structure, unique up to a small ambient isotopy ending with a CAT homeomorphism. Second, a closed topological embedding of CAT manifolds not of codimension 2 can be approximated by locally CAT flat CAT embeddings, unique up to a small ambient CAT isotopy.