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Collapsing Constant Mean Curvature Surfaces in Riemannian Manifolds

I will discuss the construction of CMC surfaces by gluing techniques in general Riemannian manifolds. These are found by assembling an approximate solution consisting of small geodesic spheres connected by embedded catenoids, which can then be perturbed to an actual solution under certain conditions on the geometry of the approximate solution. The resulting surfaces have very large mean curvature. An interesting phenomenon is that in the case where the ratio of the norm of the second fundamental form to the size of the mean curvature is very large, then it is possible to have solutions which exhibit behaviour that is very different from the 'classical' behaviour (e.g. no one-ended CMC surfaces, CMC surfaces are cylindrically bounded) that occurs in Euclidean space.