Condensation of polyhedric structures onto soap films

Vincent Feuvrier

March 19, 2010

Abstract

We study the existence of solutions to general measure-minimization problems over topological classes that are stable under localized Lipschitz homotopy, including the standard Plateau problem without the need for restrictive assumptions such as orientability or even rectifiability of surfaces. In case of problems over an open and bounded domain we establish the existence of a "minimal candidate", obtained as the limit for the local Hausdorff convergence of a minimizing sequence for which the measure is lower-semicontinuous. Although we do not give a way to control the topological constraint when taking limit yet — except for some examples of topological classes preserving local separation or for periodical two-dimensional sets — we prove that this candidate is an Almgren-minimal set. Thus, using regularity results such as Jean Taylor's theorem, this could be a way to find solutions to the above minimization problems under a generic setup in arbitrary dimension and codimension.