WEAK AND APPROXIMATE CURVATURES OF A MEASURE: A VARIFOLD PERSPECTIVE

Simon Masnou
Claude Bernard University of Lyon, France

Abstract

Varifolds are generalized surfaces which appear to be useful tools in various geometric situations. We introduce a notion of weak curvature tensor which makes sense for a suitable class of varifold measures and can be extended to ALL varifolds of any dimension and codimension through a regularization procedure. This leads to a notion of approximate second fundamental form which is well defined for datasets of very general type, e.g. point clouds. These weak and approximate curvature tensors are explicitly computable. Some compactness, consistency, and convergence results will be presented. The effectiveness of the approach will be illustrated with various numerical tests on 2D and 3D point clouds (evaluation of curvatures and geometric flows, also in presence of noise and singularities). It is a joint work with Blanche Buet (Université Paris-Sud) and Gian Paolo Leonardi (Università di Trento).