Mathematics > Differential Geometry

Local Poincaré inequalities from stable curvature conditions on metric spaces

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(Submitted on 25 Jul 2011)

We prove local Poincar\'e inequalities under various curvature-dimension conditions which are stable under the measured Gromov-Hausdorff convergence. The first class of spaces we consider is that of weak CD(K,N) spaces as defined by Lott and Villani. The second class of spaces we study consists of spaces where we have a flow satisfying an evolution variational inequality for either the R\'enyi entropy functional $E_N(\rho m) = -\int_X \rho^{1-1/N} dm$ or the Shannon entropy functional $E_\infty(\rho m) = \int_X \rho \log \rho dm$. We also prove that if the R\'enyi entropy functional is strongly displacement convex in the Wasserstein space, then at every point of the space we have unique geodesics to almost all points of the space.

Comments:	17 pages, 1 figure
Subjects:	**Differential Geometry (math.DG)**; Analysis of PDEs (math.AP); Functional Analysis (math.FA); Metric Geometry (math.MG)
MSC classes:	53C23 (Primary), 28A33, 49Q20 (Secondary)
Cite as:	**arXiv:1107.4842v1 [math.DG]**

Submission history

From: Tapio Rajala [view email]
[v1] Mon, 25 Jul 2011 05:34:14 GMT (21kb)

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