



Optimal Riemannian metric for a volumorphism and a mean ergodic theorem in complete global Alexandrov nonpositively curved spaces

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(Submitted on 2 Jun 2012)

In this paper we give a natural condition for when a volumorphism on a Riemannian manifold (M, g) is actually an isometry with respect to some other, optimal, Riemannian metric h . We consider the natural action of volumorphisms on the space \mathcal{M}_μ^n of all Riemannian metrics of Sobolev class H^s , $s > n/2$, with a fixed volume form μ . An optimal Riemannian metric, for a given volumorphism, is a fixed point of this action in a certain complete metric space containing \mathcal{M}_μ^n as an isometrically embedded subset. We show that a fixed point exists if the orbit of the action is bounded. We also generalize a mean ergodic theorem and a fixed point theorem to the nonlinear setting of complete global Alexandrov nonpositive curvature spaces.

Comments: 16 pages, 1 figure

Subjects: **Differential Geometry (math.DG)**; Functional Analysis (math.FA)

MSC classes: 58D17 (Primary) 53C23, 47A35 (Secondary)

Journal reference: AMS Contemporary Mathematics 584: Analysis, Geometry and Quantum Field Theory, (2012), 163-178

Cite as: [arXiv:1206.0368](https://arxiv.org/abs/1206.0368) [math.DG]
(or [arXiv:1206.0368v1](https://arxiv.org/abs/1206.0368v1) [math.DG] for this version)

Submission history

From: Tony Liimatainen M.Sc. [[view email](#)]
[v1] Sat, 2 Jun 2012 12:11:03 GMT (19kb,D)

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