STURM'S LAW OF LARGE NUMBERS FOR THE L^1-KARCHER MEAN OF POSITIVE OPERATORS

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Abstract

Firstly we briefly review some available versions of the strong law of large numbers in Banach spaces and nonlinear extensions provided by Sturm in CAT(0) metric spaces. Sturm's 2001 L^2-result was directly applied to the case of the geometric (also called Karcher) mean of positive matrices, thus it suggests a natural formulation of the law for positive operators. However there are serious obstacles to overcome to prove the law in the infinite dimensional case. We propose to use a recently established gradient flow theory by Lim-P for the Karcher mean of positive operators and a stochastic proximal point approximation to prove the L^1-strong law of large numbers for the Karcher mean in the operator case.

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