

Optimal transport as a source of intuition for the Ricci Flow

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We shall explain how the theory of optimal transport gives us geometric intuition for the construction of “Canonical Solitons.”

Broadly speaking, the idea is this : given a Ricci flow on a manifold M over a time interval I , we introduce a second time parameter, and define gradient Ricci solitons on the space-time $M \times I$. We shall show how this special type of soliton allows us to reconstruct in a natural geometric way some of the main foundations of the Ricci flow theory (e.g., they encode most of the monotonic quantities that underpin Perelman’s work on Ricci flow, and also lead to the fancy statements in L -optimal transport theory). Moreover, they are an effective tool to prove new results (e.g., new Harnack inequalities). Finally, we will discuss potential future applications of our construction.