

Ricci flow on 3-dimensional Lie groups

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Abstract: The behavior of Ricci flow on left-invariant metrics on three-dimensional unimodular Lie groups was classified by J. Isenberg and M. Jackson in 1992. These are interesting examples since they can be described completely, and also exhibit interesting behavior such as collapsing with bounded curvature. We revisit these Ricci flows, with an aim to get a global picture of the Ricci flow as a dynamical system on the space of Riemannian metrics up to equivalence by diffeomorphism and scaling. If there is time, we will consider the Ricci flow on 3D Lie groups and their quotients. We will show the Ricci flow as a dynamical system on the Lie algebras and study the dynamics there. We will finally look at some of the limitations of this viewpoint, with emphasis on the role of the Riemannian groupoid approach to limits.