The conjugate linearized Ricci flow on closed 3-manifolds

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with an appendix by Stefano Romano

Abstract. We characterize the conjugate linearized Ricci flow and the associated backward heat kernel on closed three-manifolds of bounded geometry. We discuss their properties, and introduce the notion of Ricci flow conjugated constraint sets which characterizes a way of Ricci flow averaging metric dependent geometrical data. We also provide an integral representation of the Ricci flow metric itself and of its Ricci tensor in terms of the heat kernel of the conjugate linearized Ricci flow. These results, which readily extend to closed n-dimensional manifolds, yield various conservation laws, monotonicity and asymptotic formulas for the Ricci flow and its linearization.