

ODE's associated to the Ricci flow for left-invariant metrics on simply-connected Lie groups

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Abstract: We discuss the Ricci flow for simply-connected Lie groups endowed with a left-invariant metric, with a particular focus on nilpotent Lie groups. We follow the evolution of the metric on a Lie group G by describing the evolution of an inner product on the associated Lie algebra \mathfrak{g} . We consider a system of ODE's that describes the evolution of the Lie bracket on \mathfrak{g} relative to a moving orthonormal frame; the solution to these ODE's determines the solution for the inner product on \mathfrak{g} at time t . We present qualitative properties of the dynamical systems that describe the evolution of the Lie bracket and the inner product, and we present some explicit solutions for the Lie bracket and inner product for soliton trajectories in large families of nilpotent Lie groups.