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Tracy L Payne* (payntrac@isu.edu), Department of Mathematics, Campus Box 8085, Idaho State University, Pocatello, ID 83209-8085. *The Ricci flow for nilmanifolds*. Preliminary report.

We consider the Ricci flow for an arbitrary nilmanifold N . First we set up the system of ODE's for the Ricci flow, using a change of variables to write the system in terms of a matrix U naturally associated to N . Then we describe qualitative properties of the flow in terms of the matrix U and a related hyperplane arrangement.

A nonabelian nilmanifold N does not admit an Einstein metric; the best metric one can hope for on N is a soliton metric. We show that if a soliton metric does exist for N , then the Ricci flow is Type-III, and the soliton metric is stable, in that it is a sink for the projectivized Ricci flow.

In the case that a soliton metric does not exist, we describe some aspects of the limiting behavior of the Ricci flow as time goes to infinity.

We illustrate these results with examples in low dimensions. (Received August 14, 2006)