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Matthias Kawski* (kawski@asu.edu), School of Mathematical and, Statistical Sciences, Tempe, AZ 85287. *Algebraic foundations of nonlinear control and feedback transformations*. Preliminary report.

Noncommuting flows are the foundation of nonlinear control. They, and the corresponding iterated integral functionals are governed by Zinbiel algebras, and other closely related nonassociative algebras. Utilizing these algebraic structure is key for efficient calculations such as the factorization of exponential Lie series which has applications to path planning and characterizing optimal controls. A special focus is on the action of the group of feedback transformations, in particular, open problems on exact nilpotentization via feedback. (Received August 10, 2016)