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Raleigh, NC 27695. *Variational calculus in non-commutative frames*. Preliminary report.

Certain variational problems, in particular, problems with symmetries and problems on Lie groups, can be studied more efficiently by utilizing non-commutative bases of vector fields that are properly adapted to the geometry of a problem. We will discuss some of the aspects of performing variational calculus relative to such frames, including derivation of Euler-Lagrange equations and establishing Noether correspondence between symmetries and conservation laws. (Received September 12, 2009)