1011-53-71   **Irina A Kogan*** (`iakogan@ncsu.edu`), Department of Mathematics, North Carolina State University, Raleigh, NC 27695, and **Ian Anderson** (`anderson@math.usu.edu`), Department of Mathematics and Statistics, Utah State University, 3900 Old Main Hill, Logan, UT 84322. *Variational Calculus in Moving Frames.*

Many interesting systems of differential equations and variational problems arising in geometry and physics admit a group of symmetries. As it was first recognized by S. Lie, these problems can be rewritten in terms of groups invariant objects: differential invariants, invariant differential forms, and invariant differential operators. It is desirable from both computational and theoretical points of view to use a group-invariant basis of differential operators and differential forms to perform further computations with symmetric systems. This provides a motivation for performing differential and variational calculus on a jet bundle relative to a non-standard moving frame. Complexity of the structure equations for a non-standard coframe and non-commutativity of differential operators present, however, both theoretical and computational challenge. We present new symbolic algorithms for computing prolongation of vector fields, integration by parts, Euler-Lagrange and Helmholtz operators, and Noether correspondence relative to a non-standrad basis of differential operators and differential forms. (Received August 11, 2005)

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