1048-58-161   **Juha Pohjanpelto*** (`juha@math.oregonstate.edu`), Department of Mathematics, Oregon State University, Corvallis, OR 97331. *Pseudogroups, Moving Frames, and Invariant Variational Principles.*

Continuous pseudogroups appear as the infinite dimensional counterparts of local Lie groups of transformations in various physical and geometrical contexts, including gauge theories, Hamiltonian mechanics and symplectic and Poisson geometries, conformal field theory, symmetry groups of differential equations, such as the Navier-Stokes and Kadomtsev-Petviashvili equations, image recognition, and geometric numerical integration.

In this talk I will describe some applications of my joint work with Peter Olver on the moving frames method to the cohomologies of the variational bicomplex invariant under a pseudogroup action and of its edge complex, the so-called Euler-Lagrange complex. Moving frames can be used to produce complete sets of differential invariants and invariant coframes on jet bundles and to analyze the algebraic structure of the invariant quantities, thus providing a basic tool for the study of invariant bicomplexes. In particular, the moving frames method allows one, at least in principle, to reduce the computation of their local cohomologies to an algebraic problem. I will illustrate the new methods in the case of the symmetry-pseudogroup of the Kadomtsev-Petviashvili equation. (Received February 05, 2009)