1035-70-1260 **Tom Mestdag*** (tom.mestdag@ugent.be), Department of Mathematics, University of Michigan, 530 Church Street, Ann Arbor, MI 48109. *Reduction and reconstruction aspects of Lagrangian systems with symmetry.*

We consider Lagrangian systems that are invariant under a non-Abelian symmetry group. There are a lot of different routes that lead to different Lagrangian reduction theories in the literature. As is well known, invariance of a Lagrangian leads via Noether's theorem to conserved quantities. Whether or not one takes such conserved quantities into account in the reduction process leads to either the 'Routh' or the 'Lagrange-Poincare' reduction method. The geometric framework which has mostly been developed in the literature, relies heavily on methods coming from the calculus of variations. In this talk, we take an alternative view and look at the Euler-Lagrange equations rather as a special class of second-order differential equations, constructed out of pure tangent bundle techniques on the velocity phase space. We show that both the reduced Lagrange-Poincare equations and the Lagrange-Routh equations can be derived in a relatively straightforward fashion from the Euler-Lagrange equations, by choosing a suitable adapted frame, or equivalently by making use of well-chosen quasi-velocities and we extend on different levels results known in the literature. Apart from investigating aspects of reduction, we also pay attention to the inverse process, that of reconstruction. (Received September 19, 2007)