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Rational and Algebraic Invariants and the Moving Frame Method

We consider rational actions of the connected algebraic groups on an affine space, and provide algorithms for constructing finite generating sets of rational and algebraic invariants, together with the algorithms for rewriting any rational invariant in terms of the generators. The construction of algebraic invariants, we propose, can be seen as an algebraic counterpart of the Fels and Olver moving frame construction for local smooth invariants on a differential manifold. In particular, we provide an algebraic equivalent for the notions of cross-section and invariantization. The algebraic formulation reduces all algorithms to Groebner bases computations, and can be easily implemented in any computer-algebra system. A generating set of rational invariants is obtained as a side product of our algorithm for constructing a generating set of algebraic invariants.

This is a joint work with E. Hubert, INRIA, France.