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Polynomial Bounds for Invariant Functions Separating Orbits

Consider the representations of an algebraic group G . In general, polynomial invariant functions may fail to separate orbits. The invariant subring may not be finitely generated, or the number and complexity of the generators may grow rapidly with the size of the representation. We instead study “constructible” functions defined by straight line programs in the polynomial ring, with a new “quasi-inverse” that computes the inverse of a function where defined.

We write straight line programs defining constructible functions that separate the orbits of G . The number of these programs and their length have polynomial bounds in the parameters of the representation.