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OPEN SETS OF POINTS WITH GOOD STABILIZERS

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1. **Observable groups and invariant theory [2].** Throughout this paper, k denotes a fixed algebraically closed field of characteristic 0 and G a connected, reductive algebraic group defined over k. (Our definitions and theorems regarding algebraic groups are taken from [**1**]. From now on, we shall always write variety instead of k-variety and morphism instead of k-morphism. A variety will always be identified with its k-rational points.) The subgroups of G in which we are interested are described in the next two definitions.

An algebraic subgroup H of G is called *observable in* G if there is a finite-dimensional rational representation $\rho: G \to GL(V)$ and a vector $v \in V$ such that $H = S_G(\rho, v) = \{g \in G \mid \rho(g)v = v\}$.

An observable subgroup H of G is said to satisfy the *codimension* 2 *condition on* G/H if there is a finite-dimensional rational representation $\rho: G \to GL(V)$ and a vector $v \in V$ such that

(a) $H = S_G(\rho, v)$;

(b) each irreducible component of $\mathrm{Cl}(G \cdot v) - G \cdot v$ has codimension $\geqq 2$ in $\mathrm{Cl}(G \cdot v)$.

(In (b), $G \cdot v$ denotes the orbit of v under the action of G. Furthermore, if A is a subset of some affine space k^m, we shall always denote by $\mathrm{Cl}(A)$ the Zariski-closure of A in k^m.)

Now let Z be an irreducible affine variety and let $k[Z]$ be the ring of regular functions on Z. We assume that G operates regularly on Z via a mapping from $G \times Z \to Z$ denoted by $(g, z) \to g \cdot z$. Then G operates on $k[Z]$ as follows: $(g \cdot f)(z) = f(g^{-1} \cdot z)$ for all $f \in k[Z]$, $z \in Z$, and $g \in G$. For H any subgroup of G we put $k[Z]^H = \{f \in k[Z] \mid h \cdot f = f \text{ for all } h \in H\}$.

The importance of observable groups in invariant theory is illustrated by the two following results.

(i) Given any subgroup H of G, there is an observable subgroup H'' of G such that for any irreducible affine variety Z on which G operates regularly, we have $k[Z]^H = k[Z]^{H''}$.

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