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Harlan Kadish* (hmkadish@math.tamu.edu), Department of Mathematics, Mailstop 3368, Texas A&M University, College Station, TX 77843-3368. *An Application of Quasi-Inverse Rings.*

Let V be a representation of a linear algebraic group G . The invariant polynomial functions on V almost always fail to separate the orbits of G . Nevertheless, there is an algorithm to compute a finite set of separating invariant functions by introducing a new quasi-inverse operation on $k[V]$: the quasi-inverse of f is $1/f$ where defined and zero elsewhere. The algorithm and the length of the functions as straight line programs have polynomial bounds in the parameters of the representation. One then considers (1) the structure of commutative rings R that have quasi-inverse operations and (2) the applications thereof to equivalence relations on $\text{Spec}(R)$. (Received August 29, 2011)