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irreducible  $G_a$ -actions*. Preliminary report.

If  $A$  is an affine domain with characteristic zero and  $D$  is a locally nilpotent derivation on  $A$  whose image is contained in some principal ideal, then it is easy to obtain a new locally nilpotent derivation on  $A$  whose image is not contained in that ideal. However, the generalization of this process to  $G_a$ -actions on affine domains with prime characteristic is not immediate. I will discuss what can go wrong and how to work around it. Being able to perform such modifications of  $G_a$ -actions will allow us to prove the following statement in a very straightforward way: Let  $A$  and  $B$  be 2-dimensional affine UFDs over an algebraically closed field. If  $A[x] \cong B[x]$  then  $A \cong B$ . (Received August 14, 2007)