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Additive group actions in positive characteristic

Roberts, Freudenburg, and Daigle and Freudenburg have given the smallest counterexamples to Hilbert's fourteenth problem. Each arises as the ring of invariants of an additive group action on a polynomial ring over a field of characteristic zero, and thus, each corresponds to the kernel of a locally nilpotent derivation. In positive characteristic, additive group actions correspond to locally finite iterative higher derivations, a more restrictive notion. We set up characteristic-free analogs of the three examples mentioned above, and show that, contrary to characteristic zero, in every positive characteristic, the invariant rings are finitely generated.

Joint work with Andreas Maurischat.