Texas Tech University. Pure Mathematics Colloquium.
Current Advances in Mathematics.

Group actions and commutative algebra

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ABSTRACT. This talk will be about various connections between the theory of transformation groups and commutative algebra, in particular, the homological properties of polynomial rings and of complete intersections rings. These concern numerical invariants associated with finite free complexes over such rings; notably, the length of the complex, the ranks of the free modules that appear in it, and the length of their homology modules. On the topological side, there are long-standing conjectures due to Adem, Browder, Carlsson, Halperin, and Swan, among others, about these invariants. Their commutative algebra counterparts are conjectures of Buchsbaum and Eisenbud, and Horrocks. My plan is to explain some of these connections, and recent developments that have spurred a resurgence of interest in them.)