Symplectic Reflection Algebras

Iain Gordon

University of Glasgow

ABSTRACT

If we're given a finite group G acting on a finite dimensional vector space V we could double things up and study the action of G on V + V*. At first sight this might not look too exciting, but it soon becomes obvious that we've added a new dimension! Indeed V+V* has a symplectic form which G preserves so we come to (G-equivariant) questions in symplectic algebraic geometry and differential operators on V. In 2002 Etingof and Ginzburg associated a family of ``symplectic reflection algebras'' to V and G, which encoded much of this doubled action. We will discuss these algebras and the role they have played in answering a basic question in algebraic geometry and confirming a nice conjecture in combinatorics and classical invariant theory. We will also explain a principal theorem that is missing at the moment. This gap is the fault of the rigidity of non-commutative algebra.