Queen's Algebraic Geometry
— Seminar —

Equivariant cohomology and orbit structure

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Abstract

Let $T = (S^1)^n$ be a torus and X a T-space. The equivariant cohomology $H_T^*(X)$ encodes the topology of the action of T on X. It is a module over the polynomial ring $A = H^*(BT)$, which makes methods from commutative algebra applicable. The situation is particularly nice if $H_T^*(X)$ is free over A. (Such an X is often called "equivariantly formal".) By a result of Atiyah and Bredon, freeness can be characterized by an exact sequence coming from the orbit filtration of X.

In this talk I will present the Atiyah–Bredon sequence and explain how to extract algebraic properties of $H_T^*(X)$ from it even if it is not exact. The general theory will be illustrated by applying it to smooth toric varieties. For such a variety X_Σ, the equivariant cohomology is isomorphic to a well-known algebraic object, namely the Stanley–Reisner ring of the fan Σ.

Most of this is joint work with Chris Allday and Volker Puppe.

Monday 18 October 2010
16:30 – 17:30
319 Jeffery Hall