

KOSZUL DUALITY AND EQUIVARIANT COHOMOLOGY

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Let G be a compact connected Lie group. Goresky, Kottwitz and MacPherson have shown how to use Koszul duality to compute the real equivariant and ordinary cohomology of a G -manifold X from certain complexes of differential forms on X and its Borel construction, respectively. Here Koszul duality refers to the equivalence of derived categories of differential modules over symmetric and exterior algebras.

In this talk we extend this result to arbitrary G -spaces and coefficients in a PID, provided that $H_*(G)$ is an exterior algebra on generators of odd degrees. Differential forms are replaced by singular cochains. This gives in particular a “singular Cartan model” for equivariant cohomology.

As by-products we obtain that $C_*(G)$ is formal in the category of A_∞ -algebras and that there exists a multiplicative quasi-isomorphism $C^*(BG) \rightarrow H^*(BG)$ for any G as above.