

GROUP ACTIONS, HODGE NUMBERS AND TORIC VARIETIES

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ABSTRACT. Given a finite group G which acts on an algebraic variety X over a number field, the associated action of G on the de Rham cohomology of X may be studied via the rational points of X over finite fields. The tools linking the subjects involve eigenvalues of Frobenius and the Hodge filtration. We shall discuss some general theorems in this vein (joint work with Mark Kisin). As an application, we derive a simple formula for the action of a finite crystallographic Coxeter group on the cohomology of its associated complex toric variety. This formula in turn has several applications, such as the theorem that the alternating representation cannot occur in the cohomology ring.

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