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Convex bodies for actions of reductive groups

Let X be a algebraic variety equipped with an action of a reductive algebraic group G. Also let L be a finite dimensional subspace of rational functions invariant under G. In this talk we discuss various convex bodies that one can associate to (X, L) which encode information about number of solutions of generic systems of equations from L plus information on multiplicities of irreducible representations appearing in powers L^k. Similarly one associates convex bodies to a projective G-variety X and a G-linearized line bundle L on X. These far generalize the notion of Newton convex polytope in toric geometry as well as Gelfand–Cetlin polytopes associated to irreducible representations of $\mathrm{GL}(n)$ (i.e., flag variety of $\mathrm{GL}(n)$).

This is a joint work with A. G. Khovanskii.