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Volumes, mixed volumes, and lattice point enumerators of convex polytopes

Abstract for the Combinatorics and Geometry/Topology Seminars 1999 April 8

This will be a survey talk on some interactions between volumes of polytopes and other branches of mathematics, especially combinatorics. Two refinements of volume will be discussed - the Ehrhart polynomial of an integer polytope and the mixed volumes of a set of polytopes. Such numbers as the degree of a toric variety, the number of linearly independent solutions to certain systems of differential equations, and the number of zeros of certain sets of polynomials, can be expressed in terms of polytope volumes. Much of the talk will be devoted to some interesting examples of polytope volumes, such as chain polytopes, flow polytopes, the polytope of degree sequences, and the Catalanotope.