

Counting lattice points inside polytopes

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Counting lattice points inside polytopes is a classical enumerative problem with far-reaching applications in vector partition functions, toric varieties, symplectic embeddings, number theory, combinatorics, and more. The theory of lattice-point enumerating functions of polytopes is now known as the Ehrhart theory. In this talk, we will introduce a few weighted and weightless lattice-point counts of rational polytopes and discuss some of their basic properties such as (quasi)-polynomiality and reciprocity laws. We will talk about a few applications of the Ehrhart theory. If time permits, we may discuss the use of Fourier-analytic methods in the Ehrhart theory and/or a connection to homogeneous dynamics on $SL(n, \mathbb{R})$.