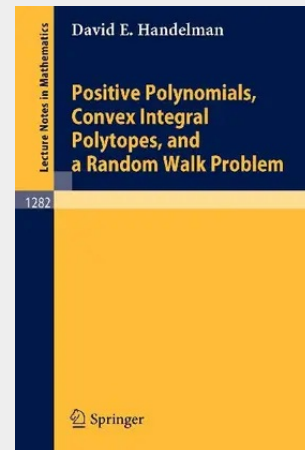


Positive Polynomials, Convex Integral Polytopes, and a Random Walk Problem

Emanating from the theory of C^* -algebras and actions of tori theorems, the problems discussed here are outgrowths of random walk problems on lattices. An $AGL(d, \mathbb{Z})$ -invariant (which is a partially ordered commutative algebra) is obtained for lattice polytopes (compact convex polytopes in Euclidean space whose vertices lie in $\mathbb{Z}^d$), and certain algebraic properties of the algebra are related to geometric properties of the polytope. There are also strong connections with convex analysis, Choquet theory, and reflection groups. This book serves as both an introduction to and a research monograph on the many interconnections between these topics, that arise out of questions of the following type: Let f be a (Laurent) polynomial in several real variables, and let P be a (Laurent) polynomial with only positive coefficients; decide under what circumstances there exists an integer n such that $P^n f$ itself also has only positive coefficients. It is intended to reach and be of interest to a general mathematical audience as well as specialists in the areas mentioned.

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