

## Integer programming in fixed dimension

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In this talk we assume the dimension to be fixed. We present Barvinok's algorithm to encode the lattice points in a polytope into a short (=polynomial size) rational generating function. We show how this result implies efficient algorithms for counting lattice points in rational polytopes, for solving integer linear programs, and for encoding interesting sets such as Hilbert bases of rational cones. Moreover, it allows the construction of an FPTAS for the maximization of polynomials over lattice points in rational polytopes.