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The beautiful combinatorics of convex polytopes

Convex polytopes attracted human attention since ancient times. Euler's formula, $V - E + F = 2$, for the numbers of vertices V , edges E , and faces F of a spacial polytope, is among the most important landmarks of mathematics, and it is a starting point for a rich theory of face numbers of polytopes in high dimensions. In the lecture I will present some major combinatorial results about polytopes, some connections to other areas of mathematics, pure and applied, a few mysterious phenomena, and some fascinating open problems.