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An Application of Combinatorial Commutative Algebra to String Theory

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For a simplicial complex the Stanley-Reisner ring is a polynomial ring modulo the ideal generated by non-faces. Its importance lies in the fact that combinatorial and topological properties of the simplicial complex, such as the face vector, the dimension and shellability, are reflected in algebraic properties of the ring. This ring was used by Stanley to prove the Upper Bound Theorem for simplicial spheres.

In this talk we review methods from combinatorial commutative algebra. As an application, we give a combinatorial description of the Manin ring, a family of quadratic algebras arising in string theory.

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