

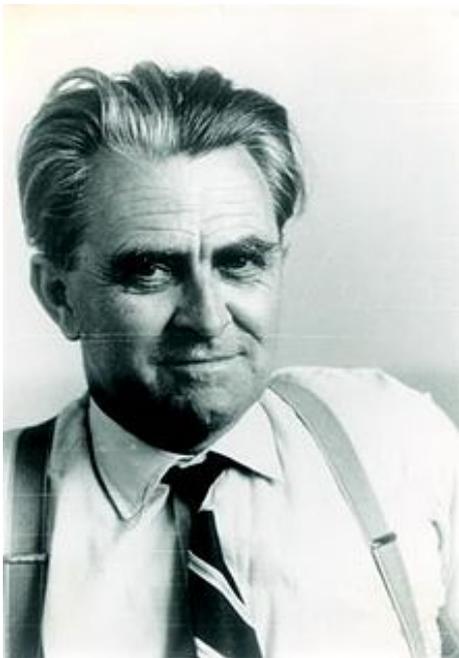
Kolloquium

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Gröbner bases and determinantal ideals



Every freshman in mathematics learns that basic algebraic problems involving integers or univariate polynomials are solved using the Euclidean algorithm and that the solutions of linear systems are obtained via Gaussian elimination. Gröbner bases and the associated division algorithm are a common generalizations of both the Euclidean algorithm and Gaussian elimination. They have been introduced by Bruno Buchberger in the sixties and allow to solve symbolically algebraic problems involving multivariate polynomials. Most of the linear systems that we encounter in nature are not in echelon form, and similarly, most of the polynomials systems and ideals are not generated by Gröbner bases.

On the other hand, families of polynomials that come from some nice and natural, algebraic, combinatorial or geometrical construction have more symmetries and more chances to be a Gröbner basis.

The goal of the talk is to present results proved by various authors in the last three decades asserting that sets of polynomials arising in classical constructions and involving determinants are indeed Gröbner bases.

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{matrix} a_{11} & a_{12} \\ a_{21} & a_{23} \\ a_{31} & a_{32} \end{matrix}$$

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