ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

2. Algebra

1991 MS Classification: 13C40, 13P10, 14M12, 16R10
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Determinantal ideals of certain subspace arrangements

Given a sequence $\mu_1 < \cdots < \mu_k$ of non-negative integers with $\mu_1 \leq 1$, we study the locus X of points $(x_1, \ldots, x_n)$ in $\mathbb{C}^n$ (where $n \geq k$) such that the $n \times k$ matrix $(x_i^{\mu_j})$ has rank smaller than k. We present a Gröbner basis of the ideal of polynomials vanishing on X. Interesting special cases involve ideals of truncations of hyperplane arrangements related to complex pseudo-reflection groups, and ideals appearing in the study of chromatic numbers of graphs. The result has consequences also in the theory of polynomial identities of matrices.

Reference: Domokos, M., Polynomial ideals and identities of matrices, “Methods in Ring Theory”, *Lecture Notes in Pure and Applied Mathematics* **198**, (1998), 83–95.