

Real zero polynomials and determinantal representations

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A real multivariate polynomial is said to be *real zero*, if it has only real roots along each line through the origin. One can associate a convex set called *rigidly convex set* to a real zero polynomial. Since every spectrahedron (feasible region of a semidefinite program) is such a rigidly convex set, it is natural to ask whether all rigidly convex sets are spectrahedra. This conjecture is called the *generalized Lax conjecture*. We will consider strict real zero polynomials and find determinantal representations of multiples of strict real zero polynomials. Next, we will discuss how that might help towards showing the generalized Lax conjecture and what the obstacles are.