

Affine Plane Curves and Determinantal Representations with Maximal Signature

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A symmetric (selfadjoint) determinantal representation of a real homogeneous polynomial is a symmetric (selfadjoint) linear matrix polynomial, whose determinant is the given polynomial. In the case of ternary forms, these have been studied to a great extent for example by Vinnikov in 1993 and particularly the relation between the topology of the real zero locus and the maximal possible signature of a representation at a given point. We will consider a more elementary approach to an affine analog of this problem from which we obtain as a special case also Vinnikov's result on the existence of definite representations of hyperbolic polynomials.