

BOUNDING THE NUMBER OF ROOTS OF ALGEBRAIC SYSTEMS: A COMBINATORIAL BOUND ON THE M-BEZOUT NUMBER

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Multihomogeneous algebraic systems are characterized by a structure that allows us to obtain tighter bounds on their number of roots than Bezout's. Motivated by the use of m-Bezout bounds in a concrete problem from distance geometry and the Euclidean embeddings of rigid graphs, we study the combinatorics of m-Bezout's bound. We derive a closed-form upper bound on the latter for a class of algebraic systems that subsumes those appearing in distance geometry and include polynomials with two variable subsets of the same degree. Our bound is expectedly not tight, since computation of the m-Bezout number is $\#P$ -hard by reduction to the permanent. On the upside, the bound is more general and tighter than the existing closed-form bound derived from the permanent.