

Real root decision algorithms for symmetric invariant polynomial systems.

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We consider the problem of deciding the existence of real points of an algebraic set defined by a system of polynomial equations having real coefficients, and which are invariant under the action of the symmetric group. We construct and analyze a Monte Carlo probabilistic algorithm which solves this problem, under some regularity assumptions on the input, by taking advantage of the symmetry invariance property. We also present an idea how to extend to the problem of deciding the existence of real points semi-algebraic sets defined by symmetric polynomials. The talk is based on a joint work with George Labahn, Cordian Riener, Mohab Safey El Din, and Éric Schost.