

1009-14-137

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Global residues for sparse polynomial systems. Preliminary report.

The global residue is a fundamental invariant of multivariate polynomial systems with finitely many roots. It is a linear function that maps every polynomial to a complex number which depends rationally on the coefficients of the system. The global residue goes back to the works of Euler, Jacobi, and Kroneker. In the toric setting the global residue was first studied by Gelfond and Khovanskii. We will present a new algorithm for computing the global residue explicitly for any given sparse polynomial system whose Newton polytopes are full-dimensional. This generalizes the previously known result by Cattani, Dickenstein, and Sturmfels when the polytopes are the same (or multiples of the same). Our result gives rise to interesting questions about lattice points in the Minkowski sum of polytopes. (Received August 13, 2005)