

DISCRETE INVARIANTS OF GENERICALLY INCONSISTENT SYSTEMS OF LAURENT POLYNOMIALS

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Let $\mathcal{A}_1, \dots, \mathcal{A}_k$ be finite sets in \mathbb{Z}^n and let $Y \subset (\mathbb{C}^*)^n$ be an algebraic variety defined by a system of equations

$$f_1 = \dots = f_k = 0,$$

where f_1, \dots, f_k are Laurent polynomials with supports in $\mathcal{A}_1, \dots, \mathcal{A}_k$. Assuming that f_1, \dots, f_k are sufficiently generic, the Newton polyhedron theory computes discrete invariants of Y in terms of the Newton polyhedra of f_1, \dots, f_k . It may appear that the generic system with fixed supports $\mathcal{A}_1, \dots, \mathcal{A}_k$ is inconsistent. In this paper, we compute discrete invariants of algebraic varieties defined by system of equations which are generic *in the set of consistent system* with support in $\mathcal{A}_1, \dots, \mathcal{A}_k$ by reducing the question to the Newton polyhedra theory. Unlike the classical situation, not only the Newton polyhedra of f_1, \dots, f_k , but also the supports $\mathcal{A}_1, \dots, \mathcal{A}_k$ themselves appear in the answers.

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