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RESULTANT OF LAURANT POLYNOMIALS WHOSE NEWTON POLYHEDRA ARE DEVELOPED

My talk is based on a joint work with Leonid Monin.

A system of n equations in $(\mathbb{C}^*)^n$ whose Newton polyhedra are developed (that is, they are in general position relative to each other) in many ways, resembles an equation in one unknown. As in the one-dimensional case, one can explicitly compute: 1) the sum of values of any Laurent polynomial over the roots of the system; 2) the product of all of the roots of the system (regarded as elements in the group $(\mathbb{C}^*)^n$). We study the resultant R (defined up to a sign) of an $(n+1)$-tuple of Laurent polynomials $P_1, ..., P_{n+1}$, such that for any n-tuple of them, the corresponding Newton polyhedra are developed. One can show that in this case $R = \pm Q_i M_i$ for any $1 \leq i \leq n$, where Q_i is the product of P_i over the common zeros of the P_j, for $j \neq i$, and M_i is a certain monomial in the coefficients of all the Laurent polynomials P_j with $j \neq i$. Thus the identity

$$Q_i M_i = Q_j M_j (-1)^{f(i,j)}$$

for some $f(i,j) \in \mathbb{Z}/2\mathbb{Z}$ holds. We find *explicit formulas for the monomials* M_i, M_j *and for the sign* $(-1)^f(i,j)$. The identity above make sense by itself (without mentioning the resultant). One can give an explicit algorithm for computing the products Q_k (for any $1 \leq k \leq n+1$). Hence we get *an explicit algorithm for computing the resultant* R.