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Invariants and Local Moduli of Singularities in Positive Characteristic

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SUMMARY

We study singularities $f \in \mathbb{K}[[x_1, \dots, x_n]]$ over an algebraically closed field \mathbb{K} of arbitrary characteristic with respect to right and contact equivalence. We establish improved bounds for the degree of determinacy in positive characteristic. Moreover, we consider different non-degeneracy conditions of Kouchnirenko, Wall and Beelen-Pellikaan in positive characteristic, and we show that Newton non-degenerate singularities satisfy Milnor's famous formula $\mu = 2\delta - r + 1$ (which in general is wrong if $\text{char}(\mathbb{K}) > 0$). Furthermore we study piecewise filtrations induced by the Newton polytope of f . In the 1970's Arnold'd introduced the condition (A), slightly weakened by Wall in 1999, which allows to compute a normal form of a power series f over the complex numbers with respect to right equivalence. We generalise Arnold's and Wall's results to arbitrary characteristic and introduce a new condition (AC) for contact equivalence which replaces condition (A). Thus we deduce normal forms and new determinacy bounds for hyper-surface singularities with respect to right and contact equivalence. This is a joint work with Y. Boubakri and T. Markwig.

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