Invariant theory of Milnor algebras
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Given a non-degenerate homogeneous form f on C^n of degree d, the Milnor algebra of f is defined as the quotient of the polynomial ring C[x_1, ..., x_n] by the ideal I of first order partials of f. For each integer k, one can define the kth Hilbert point of the Milnor algebra as the subspace of degree k polynomials contained in I. When k=n(d-2), this Hilbert point is classically called a Macaulay inverse system. We study the invariant theory of the kth Hilbert point viewed as a point in the corresponding Grassmanian. We will then be able to resolve a conjecture of Eastwood and Isaev which is related to the well-known Mather-Yau theorem for isolated hypersurface singularities.

I will be reporting on joint work with Alex Isaev and Maksym Fedorchuk.