

Positive degree deformations of weighted homogeneous singularities

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Abstract

We consider a weighted homogeneous germ of complex analytic variety $(X, 0) \subset (\mathbb{C}^n, 0)$ and a consistent function germ $f : (\mathbb{C}^n, 0) \rightarrow (\mathbb{C}, 0)$. We want to derive necessary and sufficient conditions for some deformations to have positive degree (i.e., for any additional term in the deformation, the filtration is not smaller) in terms of an adapted version of the relative Milnor number. We study the cases where $(X, 0)$ is an isolated hypersurface singularity and the invariant is the Bruce-Roberts number of f with respect to $(X, 0)$, and where $(X, 0)$ is an isolated complete intersection or a curve singularity and the invariant is the Milnor number of the function restricted to $(X, 0)$. In the last part we give some formulas for the invariants in terms of the weights and the degrees of the polynomials.

Joint work with J.J. Nuño-Ballesteros and J. N. Tomazella.