The code *mono3_gen*

Can be used to compute the pole order filtration on the cohomology of the Milnor fiber of a plane curve C having some non weighted homogeneous singularities

Let $f \in S = \mathbb{C}[x, y, z]$ be a homogeneous polynomial of degree d, such that the corresponding plane curve $C : f = 0$ in $\mathbb{P}^2$ is reduced. Then the program *mono3_gen* computes the dimension of certain terms of the second and third pages of the spectral sequences $E_*^{s,t}(f)_k$ for $k = 1, 2, ..., d$, following the procedure described in [2]. The program computes also the global Milnor number $\mu(C)$ and the global Tjurina number $\tau(C)$.

Warning. Make sure that the coordinates x, y, z are chosen such that the line $L : z = 0$ contains no singularities of the curve C. This is achieved by making a linear substitution $z = ax + by + cz$ with a, b, c general enough. Otherwise the computation of $\mu(C)$ gives a wrong value.

This program should be used ONLY in the case $\mu(C) > \tau(C)$. When $\mu(C) = \tau(C)$, the code *mono3_wh* is more efficient.

The last two columns in Table 1 give the dimensions of the second page of the spectral sequence computed as explained in [2, Sections 4]. The last two columns in Table 2 give the dimensions the third page of the spectral sequence computed as explained in [2, Sections 5].

The test is realized using [2, Proposition 6.1], and it certifies that the results are correct, i.e. the interesting part of the third page of the spectral sequence coincides with the corresponding part of the limit page.

This code is useful ONLY if we are interested in the pole order filtration or the roots of the BS-polynomials, see [1, 2]. It takes much longer time than the code *mono3_wh*, especially when the degree d of C increases.

References

[1] A. Dimca, *Hyperplane Arrangements: An Introduction*, Universitext, Springer, 2017.

[2] A. Dimca, G. Sticlaru, Computing the monodromy and pole order filtration on Milnor fiber cohomology of plane curves, arXiv: 1609.06818.