Department of Mathematics
Faculty of Natural Sciences
Jan Kochanowski University of Kielce

Mini-Workshop on Singularities. October 12, 2022

Programme

13:00 - 13:05	Greeting
13:05 - 13:35	*On the approximation theorem of M. Artin*, Arkadiusz Płoski
13:45 - 14:15	*Jumps of the Milnor number in deformations of singularities*, Tadeusz Krasiński
14:15 - 14:35	Coffee break
14:35 - 15:05	*Effective Bertini theorem and formulas for multiplicity and the local Łojasiewicz exponent*, Stanisław Spodzieja
15:15 - 15:45	*Variations on inversion theorems for Newton-Puiseux series*, Evelia R. García Barroso
16:00	Lunch, Restaurant-Bistro, building G, (entrance from the main hall on the ground floor)

Abstracts

On the approximation theorem of M. Artin

Arkadiusz Płoski

Kielce University of Technology, Poland

We will give an introduction to the famous approximation theorem of M.Artin which asserts that any formal solution of a system of analytic equations can be approximate by convergent solutions up to a given order.

References

[A]   M. Artin, *On the solutions of analytic equations*, Invent. math. 5 (1968), 277-291

[P]   A. Płoski, *Formal and convergent solutions of analytic equation*, Analytic and Algebraic Geometry 2 edited by T. Krasiński and S. Spodzieja. Łódz University Press 2017, 161-173

Jumps of the Milnor number in deformations of singularities

Tadeusz Krasiński

University of Łódź, Poland

The Milnor number of an isolated singularity $V(f)$ is one of the most important topological invariant of $V(f)$. In the lecture we describe the behaviour (jumps) of the Milnor number in deformations of plane curve singularities. This is a joint work with Justyna Walewska

Effective Bertini theorem and formulas for multiplicity and the local Łojasiewicz exponent

Stanisław Spodzieja

University of Łódź, Poland

The classical Bertini theorem on generic intersection of an algebraic set with hyperplanes states the following: Let X be a nonsingular closed subvariety of $\mathbb{P}_k^n$, where k is an algebraically closed field. Then there exists a hyperplane $H \subset \mathbb{P}_k^n$ not containing X and such that the scheme $H \cap X$ is regular at every point. Furthermore, the set of hyperplanes with this property forms an open dense subset of the complete linear system $|H|$ considered as a projective space. We show that one can effectively indicate a finite family of hyperplanes H such that at least one of them satisfies the assertion of the Bertini theorem, provided the characteristic of the field k is equal to zero. As an application of the method used in the proof we give effective formulas for the multiplicity and the Łojasiewicz exponent of polynomial mappings. This is a joint work with Tomasz Rodak and Adam Różycki from the University of Łódź.

Variations on inversion theorems for Newton-Puiseux series

Evelia R. García Barroso
Universidad de La Laguna, España

Let $f(x, y)$ be an irreducible formal power series without constant term, over an algebraically closed field of characteristic zero. One may solve the equation $f(x, y) = 0$ by choosing either x or y as independent variable, getting two finitesets of Newton-Puiseux series. In 1967 and 1968 respectively, Abhyankar and Zariski published proofs of an inversion theorem, expressing the characteristic exponents of one set of series in terms of those of the other set. In fact, a more general theorem, stated by Halphen in 1876 and proved by Stolz in 1879, relates also the coefficients of the characteristic terms of both sets of series. This theorem seems to have been completely forgotten. We give new proofs of it and we generalize it to a theorem concerning irreducible series with an arbitrary number of variables.

This talk is based on the results of [GB-GP-PP].

References

[GB-GP-PP] E.R. García Barroso, P. González Pérez, P. Popescu-Pampu *Variations on inversion theorems for Newton-Puiseux series,* Mathematische Annalen (2017) 368 (3-4), 1359-1397. doi: 10.1007/s00208-016-1503-1.