Abstract. Local/global Singularity Theory is concerned with the local/global structure of maps and spaces that occur in differential topology or theory of algebraic or analytic varieties. It uses methods from algebra, topology, algebraic geometry and multi-variable complex analysis.


Introduction by the Organisers

The workshop Singularity Theory took place from September 20 to 26, 2009, and continued a long sequence of workshops Singuläritäten that were organized regularly at Oberwolfach. It was attended by 46 participants with broad geographic representation. Funding from the Marie Curie Programme of EU provided complementary support for young researchers and PhD students.

The schedule of the meeting comprised 23 lectures of one hour each, presenting recent progress and interesting directions in singularity theory. Some of the talks gave an overview of the state of the art, open problems and new efforts and results in certain areas of the field. For example, B. Teissier reported about the Kyoto meeting on ‘Resolution of Singularities’ and about recent developments in the geometry of local uniformization. J. Schürmann presented the general picture of various generalizations of classical characteristic classes and the existence of functors connecting different geometrical levels. Strong applications of this for hypersurfaces was provided by L. Maxim. M. Kazarian reported on his new results and construction about the Thom polynomial of contact singularities; R. Rimányi used Thom polynomial theory to provide invariants for matroid varieties (e.g.
for line configurations in the plane) which answers some enumerative problems and explains certain deformation properties. M. Saito gave an overview of recent developments in the theory of jumping ideals and coefficients, spectra and $b$–functions, which has recently created a lot of activity and produces several new strong results. Sh. Ishii formulated several questions about the geometry of jet schemes.

Several connections with symplectic geometry were established and emphasized: N. A’Campo presented a new construction of ‘vanishing spine’ and (tête à tête) monodromies; Y. Namikawa about universal Poisson deformations of symplectic varieties; A. Takahashi spoke about the general program of homological mirror symmetry and exemplified it in the case of cusp singularities; M. Garay about the general KAM theorems.

Several talks targeted low–dimensional singularity theory: M. Borodzik’s talk focused on the Tristam-Levine signature to understand the deformation of cuspidal plane singularities; P. Cadman characterized the $\delta$–constant stratum; W. Ebeling presented the relation which connects the Poincaré series with the monodromy characteristic polynomial for some surface singularities; W. Veys provided a possible generalization of the ‘Monodromy Conjecture’ for normal surface singularities. J. F. de Bobadilla proved that the Nash Conjecture for normal surface singularities is topological (depends only on the resolution graph). The talk of I. Burban answered some classification questions about the structure of Cohen-Macaulay modules over non–isolated surface singularities.

The talks of C. Hertling, D. Mond and Ch. Sevenheck had their subject in the supplementary structures associated with universal unfoldings and free divisors. Mond provided several new constructions to produce free divisors. C. Sabbah overview his theory on ‘Wild geometry’ (of non–regular systems and singularities).

The meeting was closed by the talk of D. Siersma about Betti–number bounds of fibers of affine polynomial maps.

We think that the success of the meeting was also guaranteed by the fact that the younger participants also had the opportunity to present their work. Additionally, there was plenty of time for discussions, numerous collaborations started and continued.