DEMONSTRATIO MATHEMATICA
Vol. XLIII No 2 2010

PREFACE

Singularity theory, although considered a relatively recent branch of mathematics, has already played an important role in connecting various disciplines of science. Its deep and intriguing results have promoted fundamental progress in optics, image recognition and processing, control theory, mechanics, relativity theory and numerous other fields of study, including those pertaining to biological, medical and social sciences.

Annual Polish-Japanese Singularity Theory Symposia have been organized by Department of Mathematics of Hokkaido University and Faculty of Mathematics and Information Sciences of Warsaw University of Technology (with the support of Banach Center) since 2001. Their aim has been to promote international connections between research institutions, and to educate young mathematicians, with the objective of exploring the current and potential areas of interactions of singularity theory with other mathematical disciplines and of fostering active exchange of ideas among people with different scientific backgrounds. Each meeting comprised over twenty high quality research and survey lectures, while the friendly atmosphere helped maintain close contacts between the participants. The conferences were attended by the world's leading mathematicians, including Professors Heisuke Hironaka and Stanisław Łojasiewicz, as well as specialists from several countries other than Japan and Poland. Moreover, there has always been a substantial attendance of graduate and postgraduate students.

The present issue is based on the mathematical results presented during two Symposia, in 2007 and 2009. The subjects of the articles include:

- polar invariants of plane curve singularities,
- geometry of pre quasi homogeneous polynomials,
- integral elements of higher order jet spaces,
- jumps of the Milnor numbers of deformations,
- complex surface singularities,

- the Casson invariant conjecture,
- splice-quotient singularities,
- singularities of pedal curves,
- effective regularity criteria for analytic mappings,
- varieties with infinitely many maximal quasi-projective open subsets,
- lightlike developables in Minkowski 3-space,
- polygonal portraits of manifolds,
- medial axis and the moment map,
- local signature of fibered complex surfaces via moduli and monodromy,
- homotopy classification of phrases and applications,
- spacelike submanifolds in de Sitter space.

The reader will find in the issue both innovative research contributions and expository survey papers bringing new results. All presented papers, after being carefully refereed according to the principles of Demonstratio Mathematica, have been deemed suitable for publication in the Journal. The editors of the volume would like to acknowledge the generous and timely support of the publishing staff of Demonstratio Mathematica, and particularly the Managing Editor dr. Tomasz Traczyk.

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