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FAKULTÄT FÜR MATHEMATIK

Univ.-Prof. Dr. Radu Ioan Bot, Dekan

Einladung zur öffentlichen Defensio von Frau

Hana Melánová

Thema der Dissertation:

Geometric Invariants for the Resolution of Curve Singularities and for the Problem of the Moduli Space of n Points on the Projective Line

We present two applications of so-called geometric invariants defining algebraic geometric quantities of algebraic varieties. The first application is in resolution of singularities: Given a singular algebraic curve $X \subseteq A^n_C$, the task of resolution of singularities is to construct a smooth curve Y together with an almost isomorphism $\pi : Y \to X$. We study algebraic curvatures of curves – generators of the field of all geometric invariants of curves – and their basic properties in order to construct resolution of curve singularities. We show that each of these algebraic curvatures defines a height function on X which improves its singularities. Moreover, we are able to construct a geometric invariant whose corresponding height function resolves the singularities of X. The second application is for the First Fundamental Theorem for SL2(C) determining the structure of the moduli space of n points on the projective line: Consider the polynomial ring $C[x_1, \ldots, x_n, y_1, \ldots, y_n]$ and the natural action of the group SL2(C) on it. We show that the the ring of invariant polynomials under the action of SL2(C) is generated as a C-algebra by the minimal geometric invariants of surfaces.

Prüfungssenat:

Univ.-Prof. Dr. Andreas Cap (Vorsitz)
(Fakultät für Mathematik, Universität Wien)

Univ.- Prof. Herwig Hauser
(Fakultät für Mathematik, Universität Wien)

Prof. Ana Bravo Zarza
(Universidad Autnoma de Madrid)

Ao.- Prof. Dr. Josef Schico
(RISC, Johannes Kepler University, Linz

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