ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

4. Algebraic Geometry

1991 MS Classification: 14, 32
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On Chisini's Conjecture
Let $B \subset \mathbb{P}^2$ be an irreducible curve over $\mathbb{C}$ with c ordinary cusps and n nodes, as the only singularities. Put $\deg B = 2d$, and let g be the genus of its desingularization. The curve B is *the discriminant curve of a generic morphism* $f : S \to \mathbb{P}^2$, $\deg f \geq 3$, if: (i) S is a non-singular irreducible projective surface; (ii) f is unramified over $\mathbb{P}^2 \setminus B$; (iii) $f^*(B) = 2R + C$, where R is irreducible and non-singular, and C is reduced; (iv) $f_{|R} : R \to B$ is the normalization of B. Chisini's Conjecture asserts that for the discriminant curve B of a morphism f of $\deg f \geq 5$ this generic morphism is unique up to equivalence. We prove that if B is the discriminant curve of a morphism f of $\deg f > 4(3d+g-1)/(2(3d+g-1)-c)$, then, for B, the generic morphism f is unique, i. e., Chisini's Conjecture holds for B. As a consequence we prove that if the canonical bundle K_S of S is ample, f is a generic morphism such that $f^{-1}(\mathbb{P}^1) \equiv mK_S$, $m \in \mathbb{N}$, then, for B, the generic morphism f is unique except, possibly, for 3 cases. In all the exceptional cases, if for B there exist non-equivalent generic morphisms, then these morphisms have degree ≤ 6.