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The Canonical Class and the C^∞ Properties of Kähler Surfaces. (English) Zbl 0881.53057
New York J. Math. 2, 103-146 (1996).

Summary: We give a self-contained proof that for Kähler surfaces with non-negative Kodaira dimension, the canonical class of the minimal model and the (-1) -curves are oriented diffeomorphism invariants up to sign. This includes the case $p_g = 0$. It implies that the Kodaira dimension is determined by the underlying differentiable manifold. We then reprove that the multiplicities of the elliptic fibration are determined by the underlying oriented manifold, and that the plurigenera of a surface are oriented diffeomorphism invariants. We also compute the Seiberg-Witten invariants of all Kähler surfaces of non-negative Kodaira dimension. The proof uses a setup of Seiberg-Witten theory that replaces generic metrics by the construction of a localised Euler class of an infinite-dimensional bundle with a Fredholm section. This makes the techniques of excess intersection available in gauge theory.

MSC:

- 53C55** Global differential geometry of Hermitian and Kählerian manifolds
- 57N13** Topology of the Euclidean 4-space, 4-manifolds (MSC2010)
- 58B05** Homotopy and topological questions for infinite-dimensional manifolds
- 57R20** Characteristic classes and numbers in differential topology

Cited in **3** Reviews
Cited in **7** Documents

Keywords:

surfaces; 4-manifolds; Seiberg-Witten theory; infinite-dimensional intersection theory

Full Text: [EMIS](#) [EuDML](#) [arXiv](#)