Zeitschrift: L'Enseignement Mathématique

Herausgeber: Commission Internationale de l'Enseignement Mathématique

Band: 34 (1988)

Heft: 1-2: L'ENSEIGNEMENT MATHÉMATIQUE

Artikel: ABOUT THE PROOFS OF CALABI'S CONJECTURES ON COMPACT KÄHLER MANIFOLDS

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Kurzfassung: Abstract

DOI: https://doi.org/10.5169/seals-56591

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L'Enseignement Mathématique, t. 34 (1988), p. 107-122

ABOUT THE PROOFS OF CALABI'S CONJECTURES ON COMPACT KÄHLER MANIFOLDS

by Ph. DELANOË and A. HIRSCHOWITZ

ABSTRACT

The main part in the proof of Calabi's conjectures consists in *a priori* estimates of order zero, two, three. We explain how a reduction to these estimates may be performed in the framework of C^∞ functions and how higher order estimates may be derived without Schauder's elliptic theory. The main tool is an "elliptic" inverse function theorem [22] [11].

0. INTRODUCTION

T. Aubin [1, 2, 3] and S. T. Yau [23, 24] have brought positive answers to the so-called Calabi's conjectures [6], namely,

THEOREM 0.1. (Aubin, Yau). *On a compact (connected) Kähler manifold with negative first Chern class, there exists a unique Kähler-Einstein metric* g' *satisfying:* $\mathrm{Ricci}\,(g') = -g'$.

THEOREM 0.2. (Yau). *On any compact (connected) Kähler manifold, given a cohomology class* $c \in H^2(X, \mathbf{R})$ *which contains a Kähler form, every 2-form in the first Chern class is the Ricci form of some Kähler form of* c.

Mathematicians from several fields are concerned with these results, whose main consequences are listed in [23] and in [5] sections 2 and 3. Unfortunately, the proofs are quite technical, they involve rather "irregular" mathematical objects such as elliptic equations with non smooth coefficients, and they make a decisive use of Schauder theory. The aim of the present

AMS Classification (1980): Primary 47H17, 58C15, 35B45, Secondary 53C55.
Key words: Compact Kähler manifolds, Monge-Ampère operator, surjectivity method, C^∞ *a priori* estimates.