Math. Forschungsinstitut Oberwolfach
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MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

Tagungsbericht 36|1982

Komplexe Analysis

29.8. bis 4.9.1982

Die diesjährige Tagung über komplexe Analysis stand unter der Leitung von W. Barth (Erlangen), H. Grauert (Göttingen) und R. Remmert (Münster). In 24 Vorträgen wurde hauptsächlich über neue Ergebnisse aus der komplexen algebraischen Geometrie (Vektorbündel auf $\mathbb{P}_n$, Kurven im $\mathbb{P}_3$, Flächen etc.) und der transzendenten komplexen Analysis, auch über Gebiete im $\mathbb{C}^n$ berichtet.

Insgesamt nahmen 42 Mathematiker aus Europa, USA und Japan an der Tagung teil.

Vortragsauszüge

C. BANICA:

Fibrés holomorphes sur $\mathbb{P}_2$ et $\mathbb{P}_3$, topologiquement trivials

On a présenté les résultats suivants:

- Tout fibré vectoriel holomorphe de rang 2 sur $\mathbb{P}_2$, topologiquement trivial et ayant le scindage générique $(1,-1)$ ou $(2,-2)$ est déformation (locale) du fibré trivial.

- Il existe sur $\mathbb{P}_3$ des fibrés de rang 2, topologiquement trivials, qui ne sont pas (même globalement) déformation du fibré trivial.

- La classification des fibrés holomorphes de rang 2 sur $\mathbb{P}_3$, topologiquement trivials et ayant le scindage $(2,-2)$ sur la droite générale.

D. BARLET:

Intermediate algebraic Theorem

I present the following result

Theorem: Let V a compact Kähler manifold, and assume that V carries a vector bundle $\pi : F \to V$ satisfying

1°) F is a strongly n-convex manifold

2°) by each point of F pass a compact analytic subset of dimension n of F

Then, if $a(V)$ is the transcendance degree of the field of meromorphic functions of V, we have

$$a(V) \geq \dim V - n$$

For $n = o$ this reduces to the classical theorem of Kodaira, Grauert, Moisezon ...

W. BARTH:

Automorphisms of Enriques surfaces

An Enriques surface X is a quotient of some $K3$-surface Y by an involution without fixed points. In Horikawa's representation Y is a double cover of $\mathbb{P}_1 \times \mathbb{P}_1$ branched along a curve of bidegree $(4,4)$ and invariant under an involution τ of $\mathbb{P}_1 \times \mathbb{P}_1$. This representation is used to compute $\mathrm{Aut}(X)$ in two cases. For general X one finds that $\mathrm{Aut}(X)$ equals the 2-congruence subgroup of the orthogonal group of its cohomology lattice $H^2(X, \mathbb{Z}) = \mathbb{Z}^{10} \times \mathbb{Z}_2$. For a special 2-dimensional family of surfaces the result is $\mathrm{Aut}\, X = \mathbb{Z}_2 \times D_\infty$, D_∞ the infinite dihedral group. So there is no semi-continuity for automorphisms of surfaces. As an application one proves: The general Enriques surface admits 129515520 different representations as sextic surface in $\mathbb{P}_3$ passing doubly through the edges of a tetrahedron.

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R-O. BUCHWEITZ:

Classifying singularities via deformation theory

Let $X \subseteq \mathbb{C}^n$, $Y \subseteq \mathbb{C}^N$ be germs of complex spaces. Then X is a singularity of type Y, if there exists a map $\varphi : \mathbb{C}^n \to \mathbb{C}^N$, s.t. $X = Y \times_{\mathbb{C}^N} \mathbb{C}^n$ and φ is transversal to $Y \subseteq \mathbb{C}^N$, i.e. $\mathrm{Tor}_i^{\mathcal{O}_{\mathbb{C}^N}}(\mathcal{O}_Y, \mathcal{O}_{\mathbb{C}^n}) = 0$ for all $i > 0$. We want to study, when all deformations of X are of type Y.

Theorem Let X be of type Y. Then the following are equivalent:

(α) Each first-order deformation of X is of type Y.
(β) Each deformation of X is of type Y.
(γ) Y is a rigid singularity and X is unobstructed.
(δ) $T^1_Y(\mathcal{O}_X) = 0$
(ε) Y is rigid & the natural restriction $N_{Y/\mathbb{C}^N} \to N_{X/\mathbb{C}^n}$ is surjective
(η) Y is rigid and φ is transversal to D_Y, the "Auslander-module" of Y.

If $\dim T^1_X < \infty$, the foregoing assertions are equivalent to
(θ) $\exists$ an unfolding of $\psi : Y \times \mathbb{C}^n \xrightarrow{\text{incl.} \times \varphi} \mathbb{C}^N \text{ "}\to\text{" } \mathbb{C}^N$ which is a versal deformation of X.

A Corollary: A reduced singularity X is unobstructed together with each "Cartier-divisor" of X iff $T^2_X = 0$.

At the end we discuss the implications of these results for the classification of singularities.

F. CAMPANA:

Albanese Reduktion eines schwach-Kählerschen Morphismus

Für jeden schwach-Kählerschen eigentlichen surjektiven Morphismus $\varphi : X \to S$, mit glatten und irreduziblen Fasern über einer Zariski-offenen dichten Teilmenge S^* von S, existiert ein kommutatives Diagramm

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$$\begin{array}{ccc} X & \xrightarrow{\alpha} & T \\ & {\scriptstyle\varphi}\searrow \quad \swarrow{\scriptstyle\tau} & \\ & S & \end{array} ,$$

das bis auf Bimeromorphie eindeutig bestimmt ist, so daß gilt:

- τ ist analytisch, eigentlich und schwach-Kählersch
  α ist meromorph und analytisch über S^* ,
- für jedes $s \in S^*$ ist $T_s = \tau^{-1}(s)$ der Albanese-Torus von $X_s = \varphi^{-1}(s)$, und die Einschränkung von α auf X_s ist eine Albanese-Abbildung.

Anwendungen:
- Struktur der schwach-Kählerschen kompakten Räume
- Relativierung der Ergebnisse von Fujiki und Lieberman über die Automorphismengruppen von schwach Kählerschen Räumen

F. CATANESE:

Rationality of Prym moduli spaces R_g for curves of genus 3,4

Let X be a compact Riemann surface of genus $g \geq 1$, $\pi : \tilde{X} \to X$ an unramified double covering of X where $\tilde{X}$ is connected. The datum of $(\pi, \tilde{X}, X)$ is equivalent to the datum of (X, η) where $\eta \in Pic_2(X) - \{0\}$. Let M_g be the coarse moduli space for curves X as above, R_g the moduli space for pairs (X, η) as above. Then $R_g \to M_g$ is a finite covering of degree $2^{2g} - 1$. One of the basic questions in the theory of curve is: what can be said about the birational class of M_g, R_g ?

In spite of some results, like unirationality of M_g for $3 \leq g \leq 10$ (Severi), the fact that M_g is of general type for g odd ≥ 25 (Mumford-Harris), precise results were only known for $g = 1$, and this is very classical, and for $g = 2$ Igusa proved rationality of M_2, R_2, in the year sixties. In this lecture I

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want to illustrate recent results of mine: The rationality of R_3, R_4. The technique is in two steps: use the geometry of these curves to find a rational Galois cover, then compute the invariant subfield.

K. DIEDERICH:

Boundary behavior of finite holomorphic mappings

The following theorem was proved by S. Bell in 1980

Theorem: Let $\Omega_1, \Omega_2 \subset\subset \mathbb{C}^n$ be pseudoconvex domains and $\partial\Omega_1$, $\partial\Omega_2$ C^∞ smooth. Suppose that Ω_1 satisfies condition R for its Bergman projection. Let f be a finite holomorphic mapping $\Omega_1 \overset{f}{\to} \Omega_2$. Then one has for all $g \in A^\infty(\Omega_2)$ that $u \cdot g \circ f \in A^\infty(\Omega_1)$ (here $u = \det f'$) .

The main purpose of the lecture is to show how from this the smooth extendability of f to $\bar{\Omega}_1$ can be derived (recent independent work of Bell/Catlin and Diederich/Fornaess). For this one shows at first that u never vanishes to infinite order and then proves a division theorem for $A^\infty(\Omega_1)$. As a consequence one also obtains theorems about the nonexistence of branching.

ELZEIN:

Mixed Hodge Structures

Deligne proved the following in WEIL II, Publ.IHES 1981.

Proposition (6.1.13). Let V be an object of an abelian category, and W an increasing filtration on V, N a nilpotent endomorphism respecting W. Then there exist at most one finite increasing filtration M of V such that $NM_i \subset M_{i-2}$ and N^k induces

$$Gr^M_{i+k}\, Gr^W_i V \simeq Gr^M_{i-k}\, Gr^W_i V \quad .$$

It is not clear that such filtration M exists in general.

If W is pure i.e. $W_{-1} = 0$, $W_0 = V$, then M exists and it is the weight monodromy filtration constructed by Deligne.

Consider a variation of Mixed Hodge Structures (VMHS). That is: Let S be an analytic space , 1) A local system $V_{\mathbb{Z}}$ of

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$\mathbb{Z}$ - moduls on S, 2) An increasing filtration W of $V_{\mathbb{Q}} = V_{\mathbb{Z}} \times \mathbb{Q}$ by sub-local system of $\mathbb{Q}$ vector spaces,

3) A finite decreasing filtration F on $V = V_{\mathbb{Z}} \times O_S$ by sub-bundles (i.e. the filtration F vary holomorphically) such that $\nabla F^i \subset \Omega_S^1 \otimes F^{i-1}$, and (W,F) define a MHS et each point $s \in S$.

Consider a VMHS $(\mathbb{V}, \mathbb{W}, \mathbb{F})$ on D^* (punctured disc in $\mathbb{C}$).

Let $t \in D^*$ and call V the fiber of $\mathbb{V}$ at t, $T \in \operatorname{End} V$ the monodromy transformation. Suppose T unipotent and $N = \operatorname{Log} T$

We solve the following problem for geometric VMHS

Pb (Deligne in WEIL II, Publ. IHES 1981): There exists on V a finite increasing filtration M such that $NM_a \subset M_{a-2}$ and N^b induces

$$Gr^M_{a+b}\, Gr^W_a V \simeq Gr^M_{a-b}\, Gr^W_a V$$

G. FISCHER:

Differential geometry of projective space curves

If $M \subset \mathbb{P}_n(\mathbb{C})$ is a curve we associate to every point a sequence of determinants $\Delta_o, \cdots, \Delta_n$ with nonnegative real values. For $n = 3$ we deduce functions

$$\sigma = \frac{\Delta_1}{\Delta_o^2} \qquad \text{"surface factor"}$$

$$\kappa = \frac{\Delta_o^3}{\Delta_1^3}\Delta_2 \qquad \text{"curvature"}$$

$$\tau = \frac{\Delta_o^2}{\Delta_2^2}\Delta_3 \qquad \text{"torsion" .}$$

Results: 1) $1 - \kappa$ = gaussian curvature of the real surface

2) The orders of zero of σ, κ, τ correspond to the local numerical invariants of the curve.

3) The functions σ, κ, τ (with values in $\mathbb{R}_+$) determine the curve up to an isometry of $\mathbb{P}_3(\mathbb{C})$.

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K. HULEK:

Some geometric aspects of elliptic curves

It was the aim of this talk to point out a connection between a classical result of Bianchi (188o) and a problem concerning the normal bundle of elliptic quintics in $\mathbb{P}_3$. Starting with the Weierstraß σ-function one constructs an embedding of an elliptic curve C as a linearly normal curve $C_n \subseteq \mathbb{P}_{n-1}$ in such a way that the Heisenberg group $H_n \subseteq GL(n,\mathbb{C})$ operates on C_n by translation with n-torsion points. If $n = p \geq 3$ is a prime number one can associate to H_p and to the involution $\iota(e_i) = e_{-i}$ a configuration of hyperplanes and subspaces of dimension $\frac{1}{2}(p-1)$ which is of type $(p^2_{p+1}, p(p+1)_p)$. If $p = 3$ this is nothing but the "Wendepunktskonfiguration" of a plane cubic. If $p = 5$ one gets a configuration of 25 skew lines and 3o hyperplanes which form 6 socalled fundamental pentahedra.

It was then discussed in how far the above configuration in the case $p = 5$ could be used to interpret a recent result of Ellingsrud and Laksov concerning the normal bundle of elliptic space curves of degree 5.

R. LAZARSFELD:

Numerical Positivity of ample vector bundles

This is a report on joint work with W. Fulton. We say that a polynomial $P \in \mathbb{Q}[c_1,\ldots,c_e]$ is numerically positive for ample vector bundles if for every projective variety X of dimension n, and for every ample vector bundle E of rank e on X, the Chern number $\int_X P(c_1(E),\ldots,c_e(E))$ is strictly positive. Our main result describes all such numerically positive polynomials.

Specifically, we show that a non-zero polynomial $P \in \mathbb{Q}[c_1,\ldots,c_e]$ is numerically positive for ample bundles if and only if it is a non-negative linear combination of certain explicit "Schur polynomials" P_λ.

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B. MALGRANGE:

Geometric Fourier transform

I discussed the work of Bernstein, Kashiwara, Mebkhout, etc. on holonomic $\mathcal{D}$-modules and Riemann-Hilbert correspondence. Let $\mathcal{D}_X (=\mathcal{D})$ be the sheaf of linear differential operators on a complex analytic manifold X, and let M be a "differential system on X", i.e. a left coherent $\mathcal{D}$-module. One says that M is "holonomic" if its characteristic variety $\mathrm{ch}\, M \subset T^*X$ has the minimal dimension, i.e. $\dim X$, furthermore, one says that M has regular singularities if it admits a "good filtration" [locally or globally, this is equivalent, and this equivalence is a deep theorem by Kashiwara-Kawai] such that $\mathrm{gr}\, M$ is annihilated by the ideal $\mathcal{J}(\mathrm{ch}\, M)$ of elements of $\mathrm{gr}\, \mathcal{D}$ vanishing on $\mathrm{ch}\, M$.

Let $D_{b,cons}(C)$ the category of complexes of $\mathbb{C}$-modules over X with bounded and constructible cohomology (in the sense of the theory of derived categories).

Def.: $G \in D_{b,cons}(\mathbb{C})$ is called "a perverse sheaf" if the following conditions are satisfied.

1) $\underline{H}^i(G) = 0,\ i < 0$ 2) $\mathrm{Codim\,supp}\, \underline{H}^i(G) \geq i,\ i \geq 0$ 3) The dual DG in the sense of Verdier satisfies 1) and 2). The main results are the following

Theorem 1. If M is holonomic, then $R\,\mathrm{Hom}_{\mathcal{D}}(M,\mathcal{O})$ is perverse ($\mathcal{O} = \mathcal{O}_X$ sheaf of holomorphic functions on X).

Theorem 2. The functor $M \mapsto R\,\mathrm{Hom}_{\mathcal{D}}(M,\mathcal{O})$ is an equivalence of the category of holonomic $\mathcal{D}$-modules with regular singularities and the category of perverse sheaves. Theorem 1 is due to Kashiwara, Theorem 2 to Kashiwara-Mebkhout (under slightly different forms; the introduction of perverse sheaves is due to Deligne).

I discussed also briefly some examples and some aspects of this correspondence: intersection homology, relationship between vanishing cycles and microlocalisation, relation with Fourier transform.

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S. NAKANO:

Strongly pseudoconvex manifold and spc domain

Strongly pseudoconvex (spc) manifold is a complex manifold X exhausted by a C^∞ function ψ which is strictly plurisubharmonic outside a compact set K. If (Y,Ψ) is such a manifold and if $X = \{y \in Y \mid \Psi(y) < c\}$ for $\sup \Psi(K) < c < \sup \Psi(Y)$, then X is called an spc domain.

In the talk, possible sufficient condition for an spc manifold to be an spc domain was discussed. I couldn't give a complete result, but gave a plausible candidate for an ambient manifold and gave some supporting evidences.

CH. OKONEK:

Reflexive sheaves on $\mathbb{P}^n$

Let E be an r-bundle on $\mathbb{P}^2$. We study the structure of S-graded submodules N of $\bigoplus_l H^1(E(l))$, where $S = k[X_0, X_1, X_2]$ is the homogeneous coordinate ring. The result can be used to define a spectrum for reflexive sheaves on $\mathbb{P}^3$ with fixed splitting type.

The spectrum of a reflexive sheaf F is a sequence of integers, which determines part of the cohomology of F. Therefore it is necessary to study the properties of these spectra. We do this and apply the result to the following problem: classification of extremal rank-3-sheaves on $\mathbb{P}^4$.

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U. PERSSON

Double sextics and Kummer surfaces

An attempt at associating the "transcendental intersection form" on singular K-3 surfaces, represented as double sextics with a maximal number of a,d,e singularities; by finding suitable elliptic pencils and associated involutions leading to Kummer surfaces covering a process described by Shioda .

T. PETERNELL:

1-konvexe Kähler-Mannigfaltigkeiten

1-konvexe Kähler-Mgfen, die eine zusätzliche topologische Bedingung erfüllen (welche in vielen Fällen explizit verifiziert werden kann), haben folgende Eigenschaft: es gibt eine 1-konvexe Umgebung U der exzept. Menge, die offen in einer 1-konvexen quasi-projektiven Mgf mit derselben exzept. Menge liegt, d.h. "U ist nach Vergrößerung quasi-projektiv". Insbesondere ist U in $\mathbb{C}^n \times \mathbb{P}_m$ einbettbar und alle infinitesimalen Umgebungen der exzept. Menge sind projektiv-algebraisch (i.a. sind diese nur Moišezon-Räume). Ist X eine 1-konvexe Hodge-Mgf., so ist X selbst in $\mathbb{C}^n \times \mathbb{P}_m$ einbettbar und besitzt eine Umgebung U wie oben beschrieben.

Als Anwendung dieser Sätze kann man aus Verschwindungssätzen auf projektiv-algebraischen Mgfen Verschwindungssätze auf 1-konvexen Kähler-Mgfen herleiten.

G. SCHUMACHER:

An Application of the Calabi-Yau-Theorem

To families of compact complex manifolds

The theorem of Calabi-Yau implies that under simple assumptions bimeromorphic mappings of families of compact Kähler manifolds are biholomorphic. For this we show that in a family of manifolds the Kähler metrics guaranteed by the theorem of S.T. Yau depend continously on the parameter. The given

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meromorphic mapping is then an isometry and hence biholomorphic. As an application we prove the following generalisation of a theorem of W. Fischer and H. Grauert:

Theorem 1: Let $X \to S$ and $Y \to S$ be families of compact complex manifolds over a reduced complex space with isomorphic fibres $X_s \tilde{\to} Y_s$ and $c_1(X_s) < 0$ for all $s \in S$. Then X and Y are locally isomorphic over S.

Theorem 2: Let $X \to S$ and $Y \to S$ be Kähler families of manifolds with $c_1(X_s) = 0$ and $\dim \mathrm{Aut}(X_s) = \mathrm{const}$. We assume the existence of isomorphisms $X_s \tilde{\to} Y_s$ respecting the given Kähler classes. Then X and Y are locally isomorphic over S.

Corollary: In the situation of thm 1 $\mathrm{Aut}(X/S) \to S$ is proper and in thm. 2 the irreducible components of $\mathrm{Aut}^{\omega}(X/S)$ are mapped properly to S.

H.W. SCHUSTER:

Locally free resulutions of coherent sheaves on surfaces

It is an unsolved problem, if each coherent sheaf on a compact complex space is quotient of a locally free coherent sheaf. This is true if the space is algebraic (in the classical sense) and non singular, by the so called Lemma of Kleiman. In this talk the author gives two theorems.

Thm. 1: If F is a coherent sheaf on the surface X, then there exists a rank 2-bundle V such that $H^2(X, V \otimes F) = 0$.

Thm. 2: Every coherent sheaf on a surface is the quotient of a locally free coherent sheaf.

A surface is a compact connected 2-dimensional complex manifold.

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M. STEINSIEK:

Homogen-rationale Mannigfaltigkeiten und faktorielle Ringe

Sei X eine homogen-rationale Mannigfaltigkeit, G eine auf X transitiv operierende zusammenhängende einfach zusammenhängende halbeinfache komplexe Lie-Gruppe. Eine holomorphe Einbettung $f: X \to \mathbb{P}_N$ heißt normal, wenn es eine holomorphe Darstellung $\phi_f : G \to SL(N+1,\mathbb{C})$ gibt, so daß für alle $x \in X$ und $g \in G$ gilt: $\phi_f(g)(f(x)) = f(g(x))$ (diese Definition ist unabhängig von G). Eine normale Einbettung $f: X \to \mathbb{P}_N$ heißt minimal, wenn N minimal ist. Wir zeigen:

Normalitätskriterium: Sei $f: X \to \mathbb{P}_N$ eine holomorphe Einbettung. Die projektive Varietät $f(X)$ ist genau dann projektiv normal, wenn f normal ist.

Faktorialitätskriterium: Die folgenden Aussagen über eine holomorphe Einbettung $f: X \to \mathbb{P}_N$ einer homogen-rationalen Mannigfaltigkeit X sind äquivalent:

(i) Der homogene Koordinatenring von $f(X)$ ist faktoriell.

(ii) $b_2(X) = 1$, und es existiert ein linearer Unterraum $\mathbb{P}_k \subset \mathbb{P}_N$ mit $f(X) \subset \mathbb{P}_k$, so daß $f: X \to \mathbb{P}_k$ minimal ist.

E.L. STOUT:

Boundary smoothness of holomorphic functions on domains in $\mathbb{C}^N$

Let D be a domain in the complex plane with bD a simple closed curve of class C^k. If f is holomorphic on D, continuous on $\bar{D}$, and if $|f| = 1$ on an arc λ in bD, $|f| < 1$ on $\bar{D}\setminus\lambda$, then f is smooth along λ: The theory of the boundary behavior of the Riemann map together with the Schwarz reflection principle yields that f is of class C^{k-1} on λ, and, indeed, that on λ, the $(k-1)$-st derivative satisfies a Hölder condition of order α for all $\alpha \in (0,1)$.

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We have natural analogue of this in the higher dimensional case:

Theorem: Let $D \subset \mathbb{C}^N$ be a bounded, strongly pseudoconvex domain with bD of class C^k, $k \geq 3$. Let $\Sigma \subset bD$ be an N-dimensional totally real submanifold, and let $f \in A(D)$ satisfy $|f| = 1$ on Σ $|f| < 1$ on $\bar{D} \setminus \Sigma$. If Σ is of class C^r, $3 \leq r < k$, then the restriction $f_\Sigma = f|\Sigma$ of f to Σ is of class C^{r-0}, and if Σ is of class C^k, then f_Σ is of class C^{k-1}.

E. VIEHWEG:

Positivity properties of the direct image of powers of dualizing sheaves

Let $f: V \to W$ be a fibre space, i.e. a surjective morphism of projective non singular varieties (over $\mathbb{C}$) with a connected general fibre $V_w = V x_W \mathrm{Spec}(\overline{\mathbb{C}(w)})$. Let L be a minimal field of definition of V_w (up to birational equivalence) containing $\mathbb{C}$, and $\mathrm{Var}(f) = \mathrm{trzdeg}_{\mathbb{C}} L$. We consider the following question Q: If $\mathrm{Var}(f) = \dim W$, do there exist numbers μ, γ, an ample invertible sheaf M and an inclusion $\overset{r}{\oplus} M \to \hat{S}^\gamma(f_* \omega^\mu_{V/W})$, where $r = \mathrm{rk}(\hat{S}^\gamma(f_* \omega^\mu_{V/W}))$ and $\hat{S}^\gamma(\ ) =$ "the reflexive hull of the symmetric product".

The answer is "yes" in each of the following cases:

a) If for some $k > 0$ $f_* \omega^k_{V/W}$ contains an ample invertible sheaf;

b) If $K(\det(f'_* \omega^k_{V'/W'})) = \dim W'$ for all fibre spaces $f': V' \to W'$ with general fibre $V'_w \simeq V_w$;

c) If V_w is a curve;

d) If V_w is a surface and W a curve;

e) If $K(V_w) = 0$ and $\mathcal{O}_{V_w} \simeq \omega^\mu_{V_w}$ for some $\mu > 0$;

f) If $K(V_w) = \dim V_w$ and $\omega^\mu_{V_w}$ generated by its global sections for some $\mu > 0$.

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P-M. WONG:

Umbilical Hypersurfaces and Uniformization of Circular Domains

Let D be a bounded strictly pseudoconvex domain in a Stein manifold M . Assume that $D = \{\tau < 1\}$ for some exhaustion τ of M satisfying

(1) τ is C^∞ on $M \setminus \{\tau = o\} = M_*$ (2) $dd^c \tau > o$ on M^* and (3) $(dd^c \log \tau)^n \equiv 0$ on M_* where $n = \dim_{\mathbb{C}} M$. Then (i) D is biholomorphic to a bounded complete generalized weighted circular domain with smooth boundary in $\mathbb{C}^n$ iff the associated Monge-Ampère foliation is holomorphic.

(ii) D is biholomorphic to a st. pseudoconvex bounded complete weighted circular domain in $\mathbb{C}^n$ iff the foliation is holomorphic and the leaves of foliation are closed

(iii) D is biholomorphic to a st. psc. bounded complete circular domain iff the foliation is holomorphic, all leaves are closed and the integral $\int_{L \cap \partial D} d^c \log \tau$ is a constant independent of the leaf L .

The condition that the foliation is holomorphic has the following interpretation, namely with the structure induced by the Kähler metric $dd^c \tau$ on the ambient space, the real hypersurface ∂D is umbilical.

Berichterstatter: T. Peternell (Münster)

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