32 Several Complex Variables and Analytic Spaces

Vol. 529

Zentralblatt für Mathematik und ihre Grenzgebiete
Mathematics Abstracts

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32A HOLOMORPHIC FUNCTIONS OF SEVERAL COMPLEX VARIABLES

Sergeev, A. G. **32001**
Complex geometry and integral representations in the future tube in $\mathbb{C}^3$.
Teor. Mat. Fiz. 54, No. 1, 99 – 110 (Russian. English summary) (1983).
Author's summary: "It is proved that the boundary of the future tube in $\mathbb{C}^3$ [that is the domain $D = \{\zeta \in \mathbb{C}^3 : (\operatorname{Im}\zeta_1)^2 + (\operatorname{Im}\zeta_2)^2 < (\operatorname{Im}\zeta_0)^2, \operatorname{Im}\zeta_0 > 0\}$] cannot be holomorphically straightened along complex light rays lying on the boundary [which means that for each point ζ of the hypersurface $M = \{\zeta \in \mathbb{C}^3 : (\operatorname{Im}\zeta_1)^2 + (\operatorname{Im}\zeta_2)^2 = (\operatorname{Im}\zeta_0)^2, \operatorname{Im}\zeta_0 > 0\} \subset \partial D$ do not exist open subsets U and V of $\mathbb{C}^3$, a biholomorphic mapping $\varphi: U \to V$, and a hypersurface M' in $\mathbb{C}^2$ with non-degenerate Levi form such that $\zeta \in U$ and $\varphi(U \cap M) = (\mathbb{C}^1 \times M') \cap V$]. From the general Cauchy-Fantappiè formula we derive the representations of Cauchy-Bochner, Jost-Lehmann-Dyson, Leray and other integral representations for holomorphic functions and solutions of $\bar\partial$-equation in the future tube." J. Davidov.

Mantero, Anna Maria **32002**
Sur la condition de Carleson dans la boule unité de $\mathbb{C}^n$.
Boll. Unione Mat. Ital., VI. Ser., A 2, 163 – 169 (1983).
In this note the author proves the following extension of a classical result due to Carleman: Theorem. Let $(z_j)_{j\in\mathbb{N}}$ be a sequence of points in the unit ball $\mathbb{B}^n$ in $\mathbb{C}^n$: then the following facts are equivalent: (a) for $0 < p < +\infty$ there exists a constant C_p such that for every function f in the Hardy space H^p holds

$$\sum_{j\in\mathbb{N}} |f(z_j)|^p (1-|z_j|^2)^n \le C_p \|f\|_{H^p(\mathbb{B}^n)};$$

$$\text{(b)} \qquad \sup_k \sum_{j\in\mathbb{N}, j\neq k} \left(\frac{(1-|z_j|^2)(1-|z_k|^2)}{|1-\langle z_j, z_k\rangle|^2} \right)^n < +\infty.$$

The proof is reduced, by means of a result due to L. Hörmander, to show that $\mu = \sum_{j\in\mathbb{N}} \delta_{z_j}(1-|z_j|^2)^n$ is a Carleman measure if and only if (b) holds. — The author gives also a generalization of the previous result to harmonic Hardy spaces over a bounded domain in $\mathbb{R}^n$ with smooth boundary.
P. de Bartolomeis.

Demailly, Jean-Pierre **o 32003**
Constructibilité des faisceaux de solutions des systèmes différentiels holonomes. (D'après Masaki Kashiwara).
Sémin. d'Analyse P. Lelong – P. Dolbeault – H. Skoda, Années 1981/83, Lect. Notes Math. 1028, 83 – 95 (1983).
[This article was published in this book announced in this Zbl. 511.00025.]
This paper is a written account of the second part of the author's doctoral thesis; it contains an elementary introduction to a few basic ideas in the theory of partial differential equations developed by Sato-Kashiwara-Kawai. The sheaves $\mathscr{D}$, $\mathscr{E}$ of differential and microdifferential operators on a complex manifold X are introduced, and coherent $\mathscr{D}$-modules $\mathscr{M}$ are shown to correspond to the usual notion of

differential systems. The sheaf of solutions of $\mathcal{M}$ in $\mathcal{O}_X$ can then be interpreted as $\mathcal{H}om_{\mathcal{D}}(\mathcal{M},\mathcal{O})$, and the higher $\mathcal{E}xt^j_{\mathcal{D}}(\mathcal{M},\mathcal{O})$ sheaves express "obstructions" to solvability. To each coherent $\mathcal{D}$-module $\mathcal{M}$ is attached its characteristic variety $SS(\mathcal{M}) \subset T^*X$ defined as the common zero set of symbols of operators P defining $\mathcal{M}$. $SS(\mathcal{M})$ is always involutive with respect to the natural symplectic structure of T^*X, and $\mathcal{M}$ is said to be holonomic when $SS(\mathcal{M})$ is lagrangian. According to Kashiwara, one proves an extension theorem for solutions across non characteristic boundaries.
If $\mathcal{M}$ is holonomic, it follows that the sheaves $\mathcal{E}xt^j_{\mathcal{D}}(\mathcal{M},\mathcal{O})$ are constructible, i.e. locally constant of finite rank along the strata of a suitable stratification of X. Autorreferat.

32C GENERAL THEORY OF ANALYTIC SPACES

Nishino, Toshio **32004**
L'existence d'une fonction analytique sur une variété analytique complexe à dimension quelconque.
Publ. Res. Inst. Math. Sci. 19, 263 – 273 (1983).
Eine analytische Funktion $f: M \to R$ einer komplexen Mannigfaltigkeit in eine Riemannsche Fläche liefert als Konstanzflächen $f^{-1}(p) \subset M$ analytische Mengen. Die umgekehrte Frage, wann die Existenz analytischer Mengen A in M die Existenz analytischer Funktionen zur Folge hat, ist nicht trivial und nur in Spezialfällen positiv zu beantworten. Der Autor zeigt, daß die Existenz gewisser "generischer" Hyperflächen $A \subset M$ die Existenz eines $f: M \to R$ zur Folge hat. In einer früheren Arbeit [Publ. Res. Inst. Math. Sci. 1, 387 – 419 (1982; Zbl. 497.32023)] hat der Autor den Fall $\dim M = 2$ behandelt. Die vorliegende Arbeit ist im wesentlichen Beweisrückgriff auf die ältere Arbeit plus einzelner Beweisergänzungen. K. Spallek.

Flondor, Paul; Pascu, Eugen **o 32005**
Some results on mixed manifolds.
Complex analysis. Proc. 5th Rom.-Finn. Semin., Bucharest 1981, Part 2, Lect. Notes Math. 1014, 17 – 26 (1983).
[This article was published in the book announced in this Zbl. 516.00016.]
The paper contains some results on the mixed manifolds in the sense of *M. Jurchescu* ["Variétés mixtes", Romanian-Finnish seminar on complex analysis, Proc., Bucharest 1976, Lect. Notes Math. 743, 431 – 448 (1979; Zbl. 426.58002)] among which one can find: a cohomological characterization of Cartan open subsets of Cartan manifolds, a result which shows the (anti)-equivalence between Cartan manifolds and their algebras of global sections of the structure sheaf, a vanishing theorem for the cohomology of coherent sheaves and a brief study of complex vector bundles on mixed manifolds. — The main ideas of the proofs are presented. Some of these results are extensions of the known results in the complex case to the mixed case. Some examples which show that mixed phenomenons are more complicated than complex or differentiable ones are presented. Autorreferat (E. Pascu).

Demailly, J. P. **32006**
Sur la structure des courants positifs fermés.
Inst. Elie Cartan, Univ. Nancy I 8, 52 – 62 (1983).
This article is a brief account of three detailed papers of the author: Ann. Inst. Fourier 32, No. 2, 37 – 66 (1982; Zbl. 457.32005), Bull. Soc. Math. Fr. 110, 75 – 102 (1982; Zbl. 493.32003), and Invent. Math. 69, 347 – 374 (1982; Zbl. 476.58001). The first two deal with Lelong-Jensen formulas and define generalized Lelong numbers of currents with respect to a plurisubharmonic weight:

$$\nu(T,\varphi) = \lim_{r\to 0} \frac{1}{(4\pi r)^p} \int_{\{\varphi<r\}} T \wedge (dd^c\varphi)^n$$

where $\varphi \geq 0$ is a $\mathcal{C}^2$ function such that $\operatorname{Log}\varphi$ is psh, and T a bidimension (p,p) closed ≥ 0 current on a complex space X. Invariance results for $\nu(T,\varphi)$ under a change of weight are obtained, from which one deduces inequalities relating Lelong numbers of a direct image F_*T:

$$\sum_{x\in F^{-1}(y)} \mu_p(F,x)\nu(T,x) \leq \nu(F_*T,y) \leq \sum_{x\in F^{-1}(y)} \bar{\mu}_p(F,x)\nu(T,x)$$

where $F: X \to Y$ is a morphism and $\mu_p(F,x)$, $\bar{\mu}_p(F,x)$ multiplicities of F at $x \in X$. A combination of these inequalities with Jensens's formula gives a very general Schwarz lemma in $\mathbb{C}^n$ which has applications in number theory.

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For other publications concerning 32 see :

10024 10025 12011 14004 14005 14007 14010 14011 14018 14019 14022
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Rosay, Jean-Pierre: 32001
Sur une caractérisation de la boule parmi les domaines de $\mathbb{C}^n$ par son groupe d'automorphismes.
Ann. Inst. Fourier 29, 91-97 (1979).
See the preview (Autorreferat) in Zbl. 402.32001.

Boas, Harold P.: 32002
A geometric characterization of the ball and the Bochner-Martinelli kernel.
Math. Ann. (to appear)
(Dep. Math., Univ. N.C., Chapel Hill, N.C. 27514.).
The principal result is that the singular integral operator which the Bochner-Martinelli kernel induces on the boundary of a smooth bounded domain in $\mathbb{C}^n$ is self-adjoint if and only if the domain is the ball. Central to the proof is the characterization of the ball as the only smooth bounded domain such that the chord joining two arbitrary points of the boundary meets the normals at the endpoints in equal angles. Autorreferat.

Lloyd, N. G.: 32003
Remarks on generalising Rouché's theorem.
J. Lond. Math. Soc., II. Ser. 20, 259-272 (1979).
See the preview (Autorreferat) in Zbl. 407.32002.

Demailly, Jean-Pierre: 32004
Construction d'hypersurfaces irréductibles avec lieu singulier donné dans $\mathbb{C}^n$.
Ann. Inst. Fourier (à paraître)
(14 rue des Tournelles, F-75004 Paris).
Let S be an analytic set of codimension ≥ 2 in $\mathbb{C}^n$; we build irreducible hypersurfaces with singular locus S, and with restricted growth. Using a counterexample to the transcendental Bezout problem, due to M. Cornalba and B. Shiffman, we find an irreducible curve of order 0 in $\mathbb{C}^2$, and of infinite order singular locus. As an application, we also study some arithmetical properties of the convolution ring $\mathcal{E}'(\mathbb{R}^n)$. Autorreferat.

Liczberski, Piotr: 32005
On a certain family of holomorphic functions of two complex variables.
Zesz. Nauk. Politech. Łódz. 301, Mat. 11, 57-64 (1978).
[See the preceding review for the appropriate notations and terminology.]
In this paper, the author considers the space $M_b(\alpha)$ of function in H_b such that $fL(f) \neq 0$ and $\operatorname{Re}\{(1-\alpha)Lf/f + \alpha L^2(f)/L(f)\} > 0$; this relates to the previous paper by observing that $M_b(0) = M_b$ and $M_b(1) = N_b$. After cataloging some elementary properties of $M_b(\alpha)$ the author gives estimates (above and below) for the growth of $|f(z,w)|$, $|L(f)(z,w)|$ in terms of

$$G(a,b,c,r) = \frac{\Gamma(c)}{\Gamma(a)\Gamma(b)} \sum_{n=0}^{\infty} \frac{\Gamma(c+n)\Gamma(b+n)}{\Gamma(c+n)} \cdot \frac{r^n}{(n+1)!}.$$

This in turn leads to some Taylor coefficient estimates. T.A. Metzger.

Hirschowitz, André: 32006
Les deux types de méromorphie different.
J. Reine Angew. Math. 313, 157-160 (1980).
On donne l'exemple d'une surface compacte (de Kato) et d'une application à valeurs dans cette surface qui est méromorphe au sens de Stoll mais pas au sens de Remmert. Autorreferat.

Demailly, Jean-Pierre: 32007
Fonctions holomorphes à croissance polynomiale sur la surface d'équation $e^x + e^y = 1$.
Bull. Sci. Math., II. Sér. 103, 179-191 (1979).
Die Funktion $f: S \to \mathbb{C}$ sei holomorph auf der Hyperfläche $S := \{z = (x,y) \in \mathbb{C}^2 : e^x + e^y = 1\}$. Die plurisubharmonische Funktion $\varphi: \mathbb{C}^2 \to \mathbb{R} \cup \{-\infty\}$ genüge der Bedingung $|\varphi(z) - \varphi(z')| < A$ für $|z - z'| < 1$, $z, z' \in \mathbb{C}^2$. Für f gelte $|f(z)| \leq C \cdot e^{\varphi(z)}$ auf S. Dann existiert eine holomorphe Funktion $F: \mathbb{C}^2 \to \mathbb{C}$ mit $F|S = f$, für die im $\mathbb{C}^2$ die Ungleichung

$$|F(z)| \leq 10^4 \cdot C \cdot e^{3A} \cdot (1 + |z|)^5 \cdot (1 + |e^x + e^y|) \cdot e^{\varphi(z)}$$

gilt. Genügt f auf S der Ungleichung $|f(z)| \leq C \cdot (1 + |z|)^n$, $n \geq 0$, so existiert ein Polynom $P(x,y)$ vom Totalgrad $\leq n$, so daß $P|S = f$ ist. Insbesondere ist eine holomorphe beschränkte Funktion $f: S \to \mathbb{C}$ konstant. F. Sommer.

Dzhvarshejshvili, A. G.: 32008
Boundary properties of a two-dimensional Cauchy type integral.
Izv. Vyssh. Uchebn. Zaved., Mat. 1978, No. 6(193), 63-72 (Russian) (1978).
The author considers two-dimensional Cauchy type integrals

$$\frac{1}{(2\pi i)^2} \int_{\gamma_1} \int_{\gamma_2} \frac{f(t_1,t_2)\,dt_1 dt_2}{(t_1 - z_1)(t_2 - z_2)}$$

where $f(t_1,t_2) \in L_p(\gamma_1 \times \gamma_2)$, $p > 1$, and gives five theorems concerning the almost everywhere convergence when $z_1 \to t_{10} \in \gamma_1$, $z_2 \to t_{20} \in \gamma_2$ and the existence of the corresponding singular integral. S.G. Samko.

32007 o
Jarnicki, Marek:
Holomorphic functions with polynomial growth.
Proc. 1st Finnish-Polish Summer Sch. Complex Anal., Podlesice 1977, Part 1, 153-184 (1978).
[This article was published in the book announced in this Zbl. 374.00005.]
From the author's summary: "This paper is almost completely inspired by Ferrier's monograph [J. P. F e r r i e r, "Spectral theory and complex analysis" (Amsterdam 1973; Zbl. 261.46051)]. The main subject of our considerations is a characterization of holomorphic functions with polynomial growth on Riemann domains over $\mathbb{C}^n$, with special stress on holomorphic functions with polynomial growth in open sets in $\mathbb{C}^n$." J. Siciak.

32008
Harita, Mitsuru; Sakai, Eiichi:
On the continuability of holomorphic functions with real parameters.
Sci. Rep. Kanazawa Univ. 23, 69-75 (1978).
Let D be an open set in $\mathbb{C}^m \times \mathbb{R}^n$ $(m,n \geq 1)$ and $\mathfrak{F}(D)$ denote the family of all the functions $f: D \to \mathbb{C}$ such that for each point $(z^0,u^0) \in D$ there exists a polydisc $C(z^0,u^0)$ in $\mathbb{C}^{m+n}$ with the center (z^0,u^0) and the radii r_j $(j=1,\ldots,m)$ and s_k $(k=1,\ldots,n)$ which satisfies for every fixed point $(\zeta,\xi) \in C(z^0,u^0) \cap D$ the conditions: (i) $f(\zeta_1,\ldots,\zeta_{j-1},z_j,\zeta_{j+1},\ldots,\zeta_m,\xi)$ is a holomorphic function of z_j in the disc $|z_j-\zeta_j|<r_j$, (ii) $f(\zeta,\xi_1,\ldots,\xi_{k-1},u_k,\xi_{k+1},\ldots,\xi_n)$ can be continued to a holomorphic function of w_k in the disc $|w_k-u_k|<s_k$. - Let $\mathfrak{F}$ be the associated sheaf of germs of functions. The authors generalize the Hartogs-Osgood theorem by proving that: If K is a compact set in $\mathbb{C}^m \times \mathbb{R}^n$, its boundary ∂K is connected and U denotes an open neighborhood of ∂K, then for every $f \in \mathfrak{F}(U)$ there exists a function $\tilde{f} \in \mathfrak{F}(U \cup K)$ such that $\tilde{f}|U = f$. They use results and devices by H. B. Laufer, J. Siciak and F. Severi and establish several lemmas, e.g.: Let D be an open cube in $\mathbb{C}^m \times \mathbb{R}^n$, then the first cohomology group of D with coefficients in the sheaf $\mathfrak{F}$ vanishes.
C. Andreian Cazacu.

32009
Demailly, Jean-Pierre:
Fonctions holomorphes bornées ou à croissance polynomiale sur la courbe $e^x+e^y=1$.
C. r. Acad. Sci., Paris, Sér. A 288, 39-40 (1979).
For $z=(x,y) \in \mathbb{C}^2$, the author obtains a precise extension theorem, in terms of plurisubharmonic functions, for functions f holomorphic on $S: e^x+e^y=1$, and deduces from it the result that a holomorphic function of polynomial growth on S extends to a polynomial on $\mathbb{C}^2$. Applications are made to meromorphic functions and to the study of certain hypersurfaces of $\mathbb{C}^n$. E. F. Beckenbach.

32010 o
Dloussky, G.:
Analyticité separée et prolongements analytiques (D'après le dernier manuscrit de W. Rothstein).
Variétés anal. comp., Colloq., Nice 1977, Lect. Notes Math. 683, 179-202 (1978).
[This article was published in the book announced in this Zbl. 377.00008.]
This article gives a survey, including sketches of some of the proofs, of W. Rothstein's unpublished "last manuscript". The topics include the following: Extension of holomorphic and meromorphic functions under suitable conditions of separate analyticity, extension of analytic sets across pseudoconcave boundaries, and essential singularities of analytic sets. The results are, essentially, technical improvements of earlier work of Rothstein. R. M. Range.

on U. We prove that this space is a Fréchet space. It follows that $i\partial\bar\partial$ defined on $F/\mathrm{Ker}\, i\partial\bar\partial$ has a continuous inverse and we also note that this gives a representation of linear forms vanishing on Ker $i\partial\bar\partial$. Autorreferat.

Demailly, Jean-Pierre: 32005
Sur les nombres de Lelong associés à l'image directe d'un courant positif fermé.
Ann. Inst. Fourier (to appear)
(Univ. Paris, Lab. Ass. C.N.R.S. No. 213, F-75230 Paris Cedex 05.).

From a Jensen formula in several variables, one defines generalized Lelong numbers of a closed positive current relatively to a logarithmically plurisubharmonic weight. The invariance properties of these numbers with respect to analytic morphisms give precise bounds for Lelong numbers of a direct image, involving some multiplicities of the morphism. An analogous theory can be applied to study the growth of a current at infinity. Autorreferat.

Lazarsfeld, Robert: 32006
A Barth-type theorem for branched coverings of projective space.
Math. Ann. 249, 153-162 (1980).

See the preview (Autorreferat) in Zbl. 434.32013.

Ohsawa, Takeo: 32007
A reduction theorem for cohomology groups of very strongly q-convex Kähler manifolds.
Invent. Math. 63, 335-354 (1981).

Wenn X eine kompakte Kählersche Mannigfaltigkeit ist, so liefert der Satz von Hodge Aussagen über die Kohomologiegruppen von X mit Werten in der Garbe der Keime der holomorphen s-Formen. In der vorliegenden Arbeit werden analoge Aussagen hergeleitet für den Fall, daß X eine streng q-konvexe Kähler-Mannigfaltigkeit ist. Es sei X eine n-dimensionale komplexe Kähler-Mannigfaltigkeit und es bezeichne Ω^s die Garbe der Keime der holomorphen s-Formen. Auf X existiere eine C^∞-Funktion $\varphi: X \to \mathbb{R}$ mit folgenden Eigenschaften: (1) Für jedes $c > 0$ ist $\{x \in X : \varphi(x) < c\}$ relativ-kompakt in X; (2) φ ist plurisubharmonisch; (3) es gibt eine kompakte Menge K in X, so daß die Leviform $L(\varphi)$ außerhalb K mindestens $n-q+1$ positive Eigenwerte besitzt. Dann gilt das folgende Theorem: (I) Für $s+t \geq n+q$ ist $H^t(X,\Omega^s) \cong H^s(X,\Omega^t)$, (II) Für $r \geq n+q$ ist $H^r(X,\mathbb{C}) \cong \bigoplus_{s+t=r} H^s(X,\Omega^t)$. Der Verfasser merkt doch an, daß man auf die Voraussetzung der Plurisubharmonizität von φ verzichten kann. H. Kerner.

Varchenko, A. N.: 32008
Hodge properties of Gauss-Manin connectivities.
Funct. Anal. Appl. 14, 36-37 (1980); translation from Funkts. Anal. Prilozh. 14, No. 1, 46-47 (Russian) (1980).

It is given a construction of a mixed Hodge structure on the space of cohomologies vanishing in an isolated critical point of a function. The definition uses asymptotic developments of integrals of holomorphic forms over vanishing cycles and does not use a resolution of singularities. This mixed Hodge structure coincides with the mixed Hodge structure of Steenbrink. The new defintion can be used to resolve some problems formulated by Steenbrink, Malgrange. A validity of the construction is announced for functions of two variables and for some other cases. Now the validity of the construction is proven for any isolated critical point of a function. The proofs and consequences see in the author's papers: Dokl. Akad. Nauk SSSR 255, No. 5, 1035-1038 (1981), Izv. Akad. Nauk SSSR, Ser. Mat. 45, No. 5 (1981) and Dokl. Akad. Nauk SSSR 260, No. 2 (1981). Autorreferat.

Jarnicki, Marek: 32009
Holomorphic functions with bounded growth on Riemann domains over $\mathbb{C}^n$.
Bull. Acad. Pol. Sci., Sér. Sci. Math. 27, 675-680 (1979).

Es sei (X,p) ein unverzweigtes Riemannsches Gebiet über dem $\mathbb{C}^n$ und $\delta: X \to \mathbb{R}_+$ eine

Markoe, Andrew: 32010
Holomorphic convexity and the Corona property.
Rev. Roum. Math. Pures Appl. 23, 67-70 (1978).
Sei Y ein nicht notwendig reduzierter Steinscher Raum und $X \subset Y$ ein offener Teilraum mit $\mathcal{O}(X)$ als globaler holomorpher Schnittalgebra der Strukturgarbe von X. Es wird die - im reduzierten Fall wohlbekannte - Äquivalenz der folgenden drei Bedingungen gezeigt: (1) X ist Steinsch; (2) Für alle $f_1,\dots,f_k \in \mathcal{O}(X)$ mit gemeinsamer Nullstellenmenge $V(f_1,\dots,f_k) = \emptyset$ gibt es $h_1,\dots,h_k \in \mathcal{O}(X)$ mit $\sum_{i=1}^{k} f_i h_i \equiv 1$. (3) Für jedes abgeschlossene maximale $\mathcal{O}(X)$-Ideal m gilt $V(m) \neq \emptyset$.

K. Diederich.

Demailly, J.-P.: o 32011
Différents exemples de fibrés holomorphes non de Stein.
Sémin. Pierre Lelong - Henri Skoda (Anal.), Année 1976/77, Lect. Notes Math. 694, 15-41 (1978).
[This article was published in the book announced in this Zbl. 381.00006.]
H. Skoda [Inventiones math. 43, 97-107 (1977; Zbl. 365.32018)] gave a counter-example to the problem posed by Serre in 1953 whether every holomorphic fiber bundle with Stein base and Stein fiber is Stein. In his example the fiber is $\mathbb{C}^2$, the base is a domain in $\mathbb{C}$, and the transition functions are locally constant and have exponential growth. The proof depends on Lelong's inequality on the growth of plurisubharmonic functions on the fibers. In this paper the author refines Skoda's method to construct two other counter-examples. Both have $\mathbb{C}^2$ as fiber and a domain in $\mathbb{C}$ as base. In the first example the transition functions are polynomials of degree 2. In the second example the base is simply connected.

Y.-T. Siu.

Chollet, Anne-Marie: o 32012
Ensembles de zeros et ensembles pics pour des classes de fonctions analytiques a regularité imposée dans un domaine strictement pseudo-convexe.
Several complex variables, Proc. int. Conf., Cortona/Italy 1976-77, 25-54 (1978).
[Cet article a paru dans le livre annoncé dans de Zbl. 407.00002.]
Soit D un domaine borné strictement pseudoconvexe dans $\mathbb{C}^n$ à frontière régulière ∂D. On note A(D) l'algèbre des fonctions holomorphes dans D et continues dans $\bar{D}$. On s'intéresse ici aux classes de fonctions f de A(D) dont toutes les dérivées appartiennent à A(D) et vérifient de plus des conditions de croissance dans $\bar{D}$. Soit M_p une suite de réels positifs logarithmiquement convexe, on suppose qu'il existe un constante A_f telle que, pour tout entier p et tout multi-indice J de longueur p, on ait $\sup_{z \in \bar{D}} |D^J f(z)| \leq A_f^{p+1}\, p!\, M_p$. On établit des conditions suffisantes pour qu'un sous-ensemble fermé E de ∂D soit l'ensemble de zéros d'une fonction f appartenant à une telle classe ainsi que l'ensemble des zéros communs à f et à toutes ses dérivées. Soit $B^p(D)$ la classe des fonctions de A(D) dont les dérivées d'ordre 1 appartiennent à l'espace de Hardy $H^p(D)$. On donne des conditions métriques sur E pour que E soit un ensemble pic pour $B^p(D)$ c'est-à-dire pour qu'il existe une fonction f de $B^p(D)$ vérifiant $f = 1$ sur E et $|f| < 1$ dans $\bar{D} \setminus E$.

Autorreferat.

Riesenberg, Nathaniel R.: 32013
An extreme point in $H^\infty(U^2)$.
Proc. Am. Math. Soc. 76, 129-130 (1979).
Let U^n be the unit polydisc in $\mathbb{C}^n$ and let $\Sigma(U^n) = \{g \in H^\infty(U^n) \,|\, \|g\|_\infty \leq 1\}$; let

sharp for the author gives examples of Hopf manifolds X with transcendence degree from 0 to $n-1$, $n = \dim X$, generalizing a result of Ueno. U. Karras.

32L HOLOMORPHIC FIBER SPACES

Demailly, J.-P.: o 32010
Relations entre les différentes notions de fibrés et de courants positifs.
Sémin. P. Lelong - H. Skoda, Analyse, Années 1980/81, et: Les fonctions plurisousharmoniques en dimension finie ou infinie, Colloq. Wimereux 1981, Lect. Notes Math. 919, 56-76 (1982).
[This article was published in the book announced in this Zbl. 471.00012.]
To every hermitian holomorphic vector bundle E over an analytic manifold X is attached a curvature tensor $c(E) = D^2$, which is a (1,1)-form with values in Herm(E,E). One says that E is $\geq_G 0$ (Griffiths semi-positive) if for every $z \in X$, $\xi \in T_z X$ and $e \in E_z$ one has $ic(E)(\xi \otimes e, \xi \otimes e) \stackrel{\text{def}}{=} (ic(E)(\xi, i\xi).e|e) \geq 0$. We say that E is $\geq_N 0$ (Nakano), respectively $\geq_S 0$ (strongly ≥ 0) if for every $z \in X$ and $\zeta \in (TX \otimes E)_z$ we have $ic(E)(\zeta,\zeta) \geq 0$, respectively $ic(E)(\zeta,\zeta) = \sum_j \xi_j^* \otimes e_j^* \otimes \bar{\xi}_j^* \otimes \bar{e}_j^*(\zeta,\zeta)$ for some elements $\xi_j^* \in T_z^* X$, $e_j^* \in E_z^*$. Then it is clear that $E \geq_S 0 \Rightarrow E \geq_N 0 \Rightarrow E \geq_G 0$, and conversely we prove: Theorem. (1) $E \geq_G 0 \Rightarrow E \otimes \det E \geq_S 0$; (2) $E \geq_G 0 \Rightarrow E \otimes (\det E)^q \geq_S 0$, where $q = \inf(\operatorname{rank} E, \dim X)$. - Similarly, we study relationships between the notions of weakly and strongly positive differential forms, introduced by P. Lelong. Let ω be a hermitian metric and α a weakly ≥ 0 (p,p)-form on $\mathbb{C}^n$. We compute explicit constants $C = C(n,p)$, $C' = C'(n,p)$ such that $-C'(\operatorname{Tr}\alpha)\frac{\omega^p}{p!} \leq_S \alpha \leq_S C(\operatorname{Tr}\alpha)\frac{\omega^p}{p!}$. Autorreferat.

Demailly, J.-P.: o 32011
Scindage holomorphe d'un morphisme de fibrés vectoriels semi-positifs avec estimations L^2.
Sémin. P. Lelong - H. Skoda, Analyse, Années 1980/81, et: Les fonctions plurisousharmoniques en dimension finie ou infinie, Colloq. Wimereux 1981, Lect. Notes Math. 919, 77-107 (1982).
[This article was published in the book announced in this Zbl. 471.00012.]
Let $0 \to S \to E \to Q \to 0$ an exact sequence of holomorphic hermitian vector bundles over a weakly pseudoconvex kählerian manifold (X,ω). Assume given a hermitian line bundle M and a psh function φ on X such that $ic(M) + i\partial\bar\partial\varphi + i\,\mathrm{Ricci}(\omega) \geq k\,c(\det Q)$, where $k > \inf(n,q) + \inf(n,s)$, $n = \dim X$, $q = \operatorname{rank} Q$, $s = \operatorname{rank} S$, E being semi-positive in the sense of Griffiths. Using H. Skoda's results, we find for every $f \in \Gamma(X, \mathrm{Hom}(Q, Q \otimes M))$ a section h of $\mathrm{Hom}(Q, E \otimes M)$ such that $g \cdot h = f$ and $\int_X |h|^2 e^{-\varphi} dV \leq C \int_X |f|^2 e^{-\varphi} dV$, provided that the second integral is finite. Considering the exact sequence $0 \to TX \to T\mathbb{C}^p|_X \to NX \to 0$ where X is an n-submanifold of $\mathbb{C}^p$ and NX is normal bundle, we use the above splitting to construct a tubular neighborhood U of X and a holomorphic retraction $\rho: U \to X$. We also prove an extension theorem with estimates, inspired from B. Jennane's work, and which generalizes the Hörmander-Bombieri-Skoda theorem in an optimal form. Combining the above results, we find explicit estimates for U, ρ and for the extension of functions from X to $\mathbb{C}^p$, involving only geometric invariants of X. Autorreferat.

Flenner, Hubert: 32012
Eine Bemerkung über relative Ext-Garben.
Math. Ann. 258, 175-182 (1981).
Das Hauptresultat ist die folgende Aussage: Seien $f: X \to Y$ eine holomorphe Abbildung zwischen komplexen Räumen und $\mathcal{F}$, $\mathcal{G}$ kohärente $\mathcal{O}_X$-Moduln, wobei $\mathcal{G}$ flach über Y ist und der Träger von $\mathcal{F}$ oder von $\mathcal{G}$ eigentlich über Y liegt. Dann gibt es einen nach rechts beschränkten Komplex $\mathcal{M}^\bullet$ von $\mathcal{O}_Y$-Moduln mit kohärenter Kohomologie und für jeden

32012
Demailly, Jean-Pierre:
Un exemple de fibré holomorphe non de Stein à fibre C^2 ayant pour base le disque ou le plan.
Inventiones math. (à paraître)
(Nurlu, F-80240 Roisel).
We give an example of a non Stein analytic fibre bundle over the unit disc or the complex plane, with fibre C^2 and transition automorphisms of exponential type. The main argument we use is an inequality due to P. Lelong, according to which plurisubharmonic functions grow "uniformly" on the fibres.
Autorreferat.

32013
Mori, Yasuko:
An example of blowing down.
Bull. Sci. Eng. Div., Univ. Ryukyus, Math. nat. Sci. 18, 1-8 (1975).
Let $\tilde{X}$ be a complex manifold of dimension n and S a submanifold of $\tilde{X}$ of codimension 1. Assume that S has the structure of an analytic fiber bundle over a complex manifold M with fiber $\mathbb{P}^{r-1}$ $(r \geq 2)$. Let L_a denote the fiber over $a \in M$; let [e] denote the line bundle on L_a defined by a hyperplane; let [S] denote the line bundle on $\tilde{X}$ defined by the divisor S; and let $[S]_{L_a}$ denote the restriction of [S] to L_a. S. Nakano and A. Fujiki [Publ. Res. Inst. math. Sci., Kyoto Univ. 6, 483-502 (1971; Zbl. 234.32017) and ibid. 7, 637-644 (1972; Zbl. 234.32019)] have proved the following result: If $[S]_{L_a} = [e]^{-1}$ for every $a \in M$, then there exist an n dimensional complex manifold X containing M, and a holomorphic map $\pi: \tilde{X} \to X$, such that $(\tilde{X}, \pi)$ is the monoidal transform of X with center M and $S = \pi^{-1}(M)$. In this paper, the author proves the following variant of the above theorem: If $[S]_{L_a} = [e]^{-k}$ $(k \geq 2)$ for every $a \in M$, then there exist an n-dimensional complex space X containing M, and a holomorphic map $\pi: \tilde{X} \to X$, such that $(\tilde{X}, \pi)$ is the monoidal transform of X with center M. The author shows, by an explicit calculation, that each fiber L_a admits a weakly 1-complete neighborhood V in $\tilde{X}$, such that $K_V^{-1} \otimes [S]_V^{-\varepsilon}$ is positive for $\varepsilon = 1,2$. He then applies a vanishing theorem due to Nakano, to extend the projection $\pi: S \to M$ to a neighborhood of S.
A. Kas.

32014
Silva, Alessandro:
Relative vanishing theorems. I: Applications to ample divisors.
Commentarii math. Helvet. 52, 483-489 (1977).
The main object of this paper is to generalise some results of A. J. Sommese [Math. Ann. 221, 55-72 (1976; Zbl. 306.14006)]. In particular the author obtains a general version of Kodaira's vanishing theorem similar to Lemma II. A of Sommese's paper but with weaker hypotheses, and uses this to show that certain holomorphic maps from an ample divisor extend to the ambient space.
P. E. Newstead.

sharp for the author gives examples of Hopf manifolds X with transcendence degree from 0 to n - 1, n = dim X, generalizing a result of Ueno. U. Karras.

32L HOLOMORPHIC FIBER SPACES

Demailly, J.-P.: o 32010
Relations entre les différentes notions de fibrés et de courants positifs.
Sémin. P. Lelong - H. Skoda, Analyse, Années 1980/81, et: Les fonctions plurisousharmoniques en dimension finie ou infinie, Colloq. Wimereux 1981, Lect. Notes Math. 919, 56-76 (1982).
[This article was published in the book announced in this Zbl. 471.00012.]
To every hermitian holomorphic vector bundle E over an analytic manifold X is attached a curvature tensor $c(E) = D^2$, which is a (1,1)-form with values in Herm(E,E). One says that E is $\geq_G 0$ (Griffiths semi-positive) if for every $z \in X$, $\xi \in T_zX$ and $e \in E_z$ one has $ic(E)(\xi\otimes e,\xi\otimes e) \overset{\text{def}}{=} (ic(E)(\xi,i\xi).e|e) \geq 0$. We say that E is $\geq_N 0$ (Nakano), respectively $\geq_S 0$ (strongly ≥ 0) if for every $z \in X$ and $\zeta \in (TX\otimes E)_z$ we have $ic(E)(\zeta,\zeta) \geq 0$, respectively $ic(E)(\zeta,\zeta) = \sum_j \xi_j^* \otimes e_j^* \otimes \bar\xi_j^* \otimes \bar e_j^*(\zeta,\zeta)$ for some elements $\xi_j^* \in T_z^*X$, $e_j^* \in E_z^*$.
Then it is clear that $E \geq_S 0 \Rightarrow E \geq_N 0 \Rightarrow E \geq_G 0$, and conversely we prove: Theorem. (1) $E \geq_G 0 \Rightarrow E\otimes \det E \geq_S 0$; (2) $E \geq_G 0 \Rightarrow E\otimes(\det E)^q \geq_S 0$, where $q = \inf(\operatorname{rank} E, \dim X)$. - Similarly, we study relationships between the notions of weakly and strongly positive differential forms, introduced by P. Lelong. Let ω be a hermitian metric and α a weakly ≥ 0 (p,p)-form on $\mathbb{C}^n$. We compute explicit constants $C = C(n,p)$, $C' = C'(n,p)$ such that $-C'(\operatorname{Tr}\alpha)\frac{\omega^p}{p!} \leq_S \alpha \leq_S C(\operatorname{Tr}\alpha)\frac{\omega^p}{p!}$. Autorreferat.

Demailly, J.-P.: o 32011
Scindage holomorphe d'un morphisme de fibrés vectoriels semi-positifs avec estimations L^2.
Sémin. P. Lelong - H. Skoda, Analyse, Années 1980/81, et: Les fonctions plurisousharmoniques en dimension finie ou infinie, Colloq. Wimereux 1981, Lect. Notes Math. 919, 77-107 (1982).
[This article was published in the book announced in this Zbl. 471.00012.]
Let $0 \to S \to E \to Q \to 0$ an exact sequence of holomorphic hermitian vector bundles over a weakly pseudoconvex kählerian manifold (X,ω). Assume given a hermitian line bundle M and a psh function φ on X such that $ic(M) + i\partial\bar\partial\varphi + i\,\mathrm{Ricci}(\omega) \geq k\,c(\det Q)$, where $k > \inf(n,q) + \inf(n,s)$, $n = \dim X$, $q = \operatorname{rank} Q$, $s = \operatorname{rank} S$, E being semi-positive in the sense of Griffiths. Using H. Skoda's results, we find for every $f \in \Gamma(X,\operatorname{Hom}(Q,Q\otimes M))$ a section h of $\operatorname{Hom}(Q,E\otimes M)$ such that $g \cdot h = f$ and $\int_X |h|^2 e^{-\varphi} dV \leq C\int_X |f|^2 e^{-\varphi} dV$, provided that the second integral is finite. Considering the exact sequence $0 \to TX \to T\mathbb{C}^p|_X \to NX \to 0$ where X is an n-submanifold of $\mathbb{C}^p$ and NX is normal bundle, we use the above splitting to construct a tubular neighborhood U of X and a holomorphic retraction $\rho: U \to X$. We also prove an extension theorem with estimates, inspired from B. Jennane's work, and which generalizes the Hörmander-Bombieri-Skoda theorem in an optimal form. Combining the above results, we find explicit estimates for U, ρ and for the extension of functions from X to $\mathbb{C}^p$, involving only geometric invariants of X. Autorreferat.

Flenner, Hubert: 32012
Eine Bemerkung über relative Ext-Garben.
Math. Ann. 258, 175-182 (1981).
Das Hauptresultat ist die folgende Aussage: Seien $f: X \to Y$ eine holomorphe Abbildung zwischen komplexen Räumen und $\mathcal{F}$, $\mathcal{G}$ kohärente $\mathcal{O}_X$-Moduln, wobei $\mathcal{G}$ flach über Y ist und der Träger von $\mathcal{F}$ oder von $\mathcal{G}$ eigentlich über Y liegt. Dann gibt es einen nach rechts beschränkten Komplex $\mathcal{M}^\bullet$ von $\mathcal{O}_Y$-Moduln mit kohärenter Kohomologie und für jeden

such that $\partial U \subset \mathrm{supp}(\mathfrak{F})$. It is shown that if ∂U satisfies some convexity conditions then there exists an element in $H^q(U,\mathfrak{F})$ which is not extendible at any point of ∂U. This result is a generalization of a theorem of Andreotti and Norguet which considered the case when X is a complex manifold and $\mathfrak{F}$ a locally free sheaf. Autorreferat.

Demailly, Jean-Pierre: 32021
Estimations L^2 pour l'operateur $\bar\partial$ d'un fibré vectoriel holomorphe semi-positif au-dessus d'une variété Kählérienne complète.
Ann. Sci. Ec. Norm. Supér., IV. Sér. 15, 457-511 (1982).
Let E be a hermitian vector bundle of rank r over a n-dimensional Kähler manifold X. The bundle E is said to be s-positive if its curvature tensor $ic(E)$ identified with a hermitian form on $TX \otimes E$ takes >0 values on tensors of rank $\le s$ and $\ne 0$. For example, if E is Griffiths >0 (i.e. 1-positive) of rank $r \ge 2$, one shows that $E^* \otimes (\det E)^s$ is s-positive and that $E \otimes \det E$ is Nakano >0 (i.e. n-positive). In connection with these results, one proves the following vanishing theorem: if E is s-positive and X is weakly pseudoconvex, then $H^q(X, \Lambda^n T^*X \otimes E) = 0$ for $q \ge \sup(1, n-s+1)$. Given a surjective morphism $E \to Q \to 0$ of hermitian bundles, one also obtains curvature conditions which imply the surjectivity of the map $H^q(X, E \otimes L) \to H^q(X, Q \otimes L)$, $0 \le q < n$, where L is a line bundle. All these results are proved in quantitative versions using L^2 estimates and plurisubharmonic weights. In order to get rid of continuity assumptions for weights or exhaustion on X, is developed a smoothing method for psh functions involving the exponential map $TX \to X$. Especially, if X has an upper semicontinuous exhaustive psh function, then it can be endowed with a complete Kähler metric. Autorreferat.

32M-N COMPLEX SPACES WITH A GROUP OF AUTOMORPHISMS. AUTOMORPHIC FUNCTIONS.

Yoshida, Masaaki: 32022
Volume formula for certain discrete reflection groups in PU(2,1).
Mem. Fac. Sci., Kyushu Univ., Ser. A 36, 1-11 (1982).
For the 27 discrete subgroups of PU(2,1), studied by E. Picard, T. Terada, G. D. Mostow and P. Deligne, the author calculates the volumes of the fundamental domains in the complex two dimensional unit ball. Autorreferat.

Huckleberry, Alan T.; Snow, Dennis M.: 32023
Almost-homogeneous Kähler manifolds with hypersurface orbits.
Osaka J. Math. 19, 763-786 (1982).
In this paper we prove a classification theorem under the following assumption: (1) X is a compact Kähler manifold, (2) G is a complex Lie group acting holomorphically on X and has an open orbit Ω and (3) a compact subgroup K of G has an orbit which is a real hypersurface in Ω. The classification is in terms of canonical holomorphic fibrations of Ω which are meromorphically and G-equivariantly extendible to X. For example, if $b_1(X)=0$, then X is projective rational, G is reductive, and there is such a fibration $G/H \to G/P$ with Stein fiber and homogeneous rational base. There are in fact very few possibilities for P/H: $\mathbb{C}^*$, $\mathbb{C}^n$, or the tangent bundle of a symmetric space of rank 1. It should be mentioned that D. N. Akiezer has proved algebraic versions of these results [see his announcement in Sov. Math., Dokl. 20, 278-281 (1979); translation from Dokl. Akad. Nauk SSSR 245, 281-284 (1979; Zbl. 437.14027)]. Autorreferat.

Huckleberry, A. T.; Margulis, G. A.: 32024
Invariant analytic hypersurfaces.
Invent. Math. 71, 235-240 (1983).
If X is a complex space, we let $\mathcal{H}(X)$ denote the set of pure 1-codimensional closed complex analytic subsets of X, i.e. the analytic hypersurfaces. If G is a group acting on X, then $\mathcal{H}(X)^G$ denotes the set of G-invariant hypersurfaces. D. N. Akhiezer [Invent. Math. 65, 325-329 (1982; Zbl. 479.32010)] recently showed

32 Several Complex Variables and Analytic Spaces

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32A HOLOMORPHIC FUNCTIONS OF SEVERAL COMPLEX VARIABLES

Balashova, O. Yu.: o 32001
The expansion in Dirichlet series for functions holomorphic in a polyhedron and the dual interpolational Lagrange series.
Some questions of multidimensional complex analysis, Work Collect., Krasnoyarsk 1980, 13-18 (Russian) (1980).
[This article was published in the book announced in this Zbl. 461.00010.]
Let $D\subset\mathbb{C}^n$ be a bounded convex Weil domain, i.e. $D=\{Z\in\mathbb{C}^n : \ell_p(Z)\in G_p,\ 1\leq p\leq m$, where ℓ_p are linear forms, and the G_p bounded convex domains$\}$. Then, for any holomorphic function in a neighbourhood of $\bar D$, the author constructs an explicit expansion in exponentials of linear forms; the proof is based on the construction in the case $n=1$ due to A. F. Leont'ev [Usp. Mat. Nauk 24, No. 2(146), 97-164 (1969; Zbl. 176, 24)]. The result is then used to obtain a generalised Lagrange interpolation series for entire functions of exponential type on $\mathbb{C}^n$.
R. R. Simha.

Chen, Shujin: 32002
An integral representation in the space $\mathbb{C}^n$.
Acta Math. Sin. 24, 538-544 (Chinese) (1981).
Let R be a bounded domain in $\mathbb{C}^n$, R_j $(1\leq j\leq n)$ be bounded plane domains, and w_j $(1\leq j\leq n)$ be continuously differentiable functions on R. Let D be a relatively compact open subset of R which is a component of $\{z\in R|w_j(z)\in R_j,\ 1\leq j\leq n\}$. The paper gives a formula for the integral representation of holomorphic functions defined on the closure of D.
Y.-T. Siu.

Demailly, J.-P.: 32003
Formules de Jensen en plusieurs variables et applications arithmétiques.
Bull. Soc. Math. Fr. 110, 75-102 (1982).
Using a generalization in several variables of Jensen's formula, we derive lower bounds for Lelong numbers of the type

$$\nu(T,\varphi)=\lim_{r\to 0}\frac{1}{(2\pi r)^{n-1}}\int_{\{\varphi<r\}} T\wedge(i\partial\bar\partial\varphi)^{n-1}$$

where $T=\frac{i}{\pi}\partial\bar\partial\,\mathrm{Log}\,|F|$, $\varphi=\sum_{j=1}^{N}|P_j|^2$ and F, P_j are entire functions on $\mathbb{C}^n$ (φ is assumed to be exhaustive). If $w_1,\dots,w_s$ are common zeroes of F, P_j with multiplicities at tions for a principal H-bundle E over M, trivial over each U_α. It is shown that the gauge fields determine a connection on the bundle and therefore the symmetry problem is equivalent to the classification of G-invariant connections. Because the determination of all principal H-bundles with G-action projecting to the given action on M and of all invariant connections on such bundles is too general, the attention is restricted to actions on a base manifold with sufficiently regular orbit structure. Both transitive and intransitive group actions are considered, and the standard solution for homogeneous base spaces is extended to certain more general cases. To illustrate the results, some examples on the compactified Minkowski space are given, considering the group SU(2) as gauge group H. G. Zet.

Demailly, J.-P.; Skoda, H.: o 55011
Relations entre les notions de positivités de P. A. Griffiths et de S. Nakano pour les fibrés vectoriels.
Sémin. P. Lelong - H. Skoda, Analyse, Années 1978/79, Lect. Notes Math. 822, 304-309 (1980).
[This article was published in the book announced in this Zbl. 428.00008.]
We prove that if E is a holomorphic hermitian vector bundle on a complex manifold X and if E is positive in the weak sense of Griffiths, then the vector bundle $E \otimes \det E$ is positive in the strong sense of Nakano. Therefore there are many vector bundles which are in a natural way positive in the sense of Nakano, in contrast with the general earlier feeling of the specialists. The interest of this kind of positivity is that the vanishing theorem of Nakano implies $H^q(X, E \otimes \det E)$ for every $q \geq 1$ (this last result was proved using another argument by P. Griffiths). Some applications to the surjective morphisms of vector bundles are given. A more detailed study of the relations between the two kinds of positivity has been developed by J. - P. D e m a i l l y in "Relations entre les différentes notions de fibrés et courants positifs" to appear in Sémin. P. Lelong-H. Skoda, 1980-1981 (Springer). Autorreferat.

Good, R. E.: 55012
Approximate torus fibrations of high dimensional manifolds can be approximated by torus bundle projections.
Trans. Am. Math. Soc. 258, 87-97 (1980).
The author studies approximate fibrations $p: E \to B$ [D. S. C o r a m and P. F. D u v a l l , Rocky Mountain J. Math. 7, 275-288(1977; Zbl. 367.55019)], whose fibers have the shape of a 2-torus T^2. The main result asserts that p is a limit of torus bundle projections provided E and B are topological manifolds, $\dim B = n \geq 6$, $\dim E = n + 2$. In order to prove this the author first characterizes approximate fibrations, whose fiber has the shape of a compact ANR F, as maps with a certain local homotopy product structure with fiber F. The principal tools in the proof of the main result include the torus trick developed by R. K i r b y and L. C. S i e b e n m a n n [Topology 11, 271-294 (1972; Zbl. 216, 201)] and the fact that each self homotopy equivalence of $S^k \times T^2$ is homotopic to a homeomorphism [W. C. H s i a n g and C. T. C. W a l l , Bull. Lond. Math. Soc. 1, 341-342 (1969; Zbl. 176, 220)]. S. Mardešić.

Kamata, Masayoshi; Maki, Haruo: 55013
Note on the relation of γ-classes to characteristic classes.
Math. Rep. Coll. Gen. Educ., Kyushu Univ. 12, 69-76 (1980).
Let $F = C$ or R, and let γ_i^F be the γ-operation in K_F-theory. The first purpose of this note is to give a sufficient condition on which the K_F-theory characteristic class is stronger than the ordinary characteristic class. The main theorem is as follows. Let ξ be a complex (resp. real) vector bundle over a finite CW-complex X. Suppose that the Atiyah-Hirzebruch spectral sequence for $K_C(X)$ is trivial. Then if $\gamma_i^C(\xi - \dim_C \xi) = 0$ (resp. $\gamma_i^R(\xi - \dim_R \xi) = 0$) for any $i \geq m$ (resp. $i \geq 2m$), the Chern classes $c_i(\xi) = 0$ (resp. the Pontrjagin classes $p_i(\xi) = 0$) for $i \geq m$. The proof is based on the fact that the Boardman map is injective if the Atiyah-Hirzebruch

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57019 57023 60009 60076 62017 65033 70015 70017 73088 92010 93012
93032 93036

58A GENERAL THEORY OF DIFFERENTIABLE MANIFOLDS

Demailly, Jean-Pierre: 58001
Extremal positive currents and Hodge conjecture.
Invent. Math. (to appear)
(14, rue des Tournelles, F-75004 Paris).
This paper aims to give examples in $\mathbb{P}^n$ and $\mathbb{C}^n$ of extremal elements on the cone of closed strongly positive currents, which are not integration currents over analytic subsets. The construction rests upon a general support theorem for closed positive currents. Then we study the relationship with Hodge conjecture, as well as related cohomological obstructions. In this vein, we prove an approximation theorem for currents of bidegree (1,1) by irreducible divisors, on projective varieties or Stein manifolds. Autorreferat.

Koike, S.: 58002
On condition (a(f)) of a stratified mapping.
Ann. Inst. Fourier (to appear)
(Dep. Math., Fac. Sci., Kyoto Univ., Kyoto 606, Jap.).
Pour une application stratifiée f, on considère la condition (a_f) concernant le noyau de la différentiel de f. On montre que la condition (a_f) est équivalent à la condition (a_s^f) qui a un contenu plus évident géométrique. Autorreferat.

58B INFINITE-DIMENSIONAL MANIFOLDS

Kriegl, Andreas: D 58003
Eine Theorie glatter Mannigfaltigkeiten und Vektorbündel.
(Dissertation).
Universität Wien. 111 S. (1980).
The aim of this paper is to establish a theory of (infinite dimensional) smooth manifolds and vector bundles, which satisfies two aspects. 1st: The corresponding categories of manifolds and vector bundles are closed under the product-, the tangent space- and the function space functor. Furthermore the exponential law is valid, i.e. the category of manifolds is cartesian closed. 2nd: In the finite dimensional case it yields the usual smooth manifolds and vector bundles. The starting point is a theory of U. Seip (A Convenient Setting for Smooth Manifolds, Preprint). There the differential structure is defined via the smooth curves

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57012 70006 70013 70015 93006 93015 93028

58A GENERAL THEORY OF DIFFERENTIABLE MANIFOLDS

Demailly, Jean-Pierre: 58001
Courants positifs extrêmaux et conjecture de Hodge.
Invent. Math. 69, 347-374 (1982).
See the preview (Autorreferat) in Zbl. 476.58001.

Skoda, Henri: 58002
Prolongement des courants, positifs, fermés de masse finie.
Invent. Math. 66, 361-376 (1982).
The aim of the paper is to prove an extendibility theorem as in E. Bishop [Mich. Math. J. 11, 289-304 (1964; Zbl. 143, 303)] for positive closed currents.
A classical theorem of Bishop asserts the following: let A be a subvariety of the complex manifold Ω and let X be a subvariety of $\Omega\setminus A$ of pure dimension and of finite volume, then the closure $\bar{X}$ of X is a subvariety of Ω. We prove that if T is a closed (weakly) positive, current on $\Omega\setminus A$ of locally finite mass near A, then the trivial extension $\tilde{T}$ of T to Ω (i.e. $\tilde{T}$ has no mass on A) is a closed, positive current. Bishop's theorem is the case where T is the current of integration on an analytic subvariety X.
R. Harvey and J. Polking [Commun. Pure. Appl. Math. 28, 701-727 (1975; Zbl. 323.32013)] have proved our result, when T is of bidimension (p,p) and when A is also of dimension p. Our method is quite different and, in some sense, more elementary. They use extension through A of a plurisubharmonic function u on $\Omega\setminus A$, connected with T. We use a convenient approximation of $\tilde{T}$ by truncated currents $\chi_\nu T$ where $\chi_\nu \in \mathcal{D}(\Omega\setminus A)$ is converging to the characteristic function of $\Omega\setminus A$. We have in the sense of currents: $\partial\tilde{T} = \lim_{\nu\to\infty} \bar{\partial}\chi_\nu \wedge T$. Therefore to prove that $\tilde{T}$ is $\bar{\partial}$-closed, we prove that the current $\bar{\partial}\chi_\nu \wedge T$ converges to 0 for the mass-topology. We need a careful estimate of the mass of the current T near A. We obtain this estimate using a generalization of a classical formula of P. Lelong which gives a relation between the projective measure and the trace-measure of a closed positive current.
Recently, H. El Mir [C.R. Acad. Sci. Paris, Sér. A 294, 181-184 (1982)] has obtained a generalization of my result. He only supposes that A is a closed, complete pluripolar set. He uses a similar method but he has a completely new idea to estimate the mass of T near A. Autorreferat.