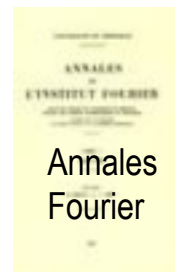
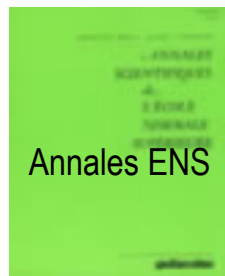


# Introduction

- A long tradition in publication of mathematics
  - *Les Annales de Gergonne*, first purely mathematical journal ever published (1810-1831)
- Some of the foremost current mathematical journals are published in France :



What is MathDoc and what are we doing for  
electronic publication?



# MathDoc Team

*and the electronic  
publishing of  
mathematics*

- MathDoc team
- NUMDAM
- GALLICA
- CEDRAM
- MiniDML

- Created in 1995 by Profs P. Bérard et L. Guillopé
- Support: CNRS, Univ. J Fourier (Grenoble)
- 2 mathematicians, 3 computer scientists, 3 librarian/information scientists
- Many aspects of online mathematical documentation:
  - Combined library catalogs
  - Online preprint & theses database
  - Software development (Zentralblatt, library software)
  - ...
  - Online digital libraries (NUMDAM...)
  - Centre for academically published journals (CEDRAM)

EIPub conference,  
Leuven, 8th June 2005



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# The NUMDAM digital archive: What?

- *Digitise for archiving and delivery the backrun of academic mathematical journals*
- Archiving :
  - Integral scanning from the first page up to the last one of each volume, including covers, plates, unbound leafs, ads, etc.
- Delivery :
  - One multipage file per article, access through tables of contents browsing or searching, freely downloadable after a variable moving wall.

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Leuven, 8th June 2005



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# The NUMDAM digital archive: Why ?

- Mathematical literature never becomes obsolete.
- Useful to other sciences in an *asynchronous* fashion.
- Valid as a *whole*: → network of (international) references.
- Isolated academic journals starve against commercial concentration.
- Digital format → living journals (links...)



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# The NUMDAM digital archive: economic model

- Electronic version under the title owner's control.
- Authors are asked to give their (exclusive) electronic copyright to them if still alive
- MathDoc contracts with the copyright owner to allow access at [www.numdam.org](http://www.numdam.org).
- Clear identification of the originating journal (logo, links, first page).
- Moving wall agreed by both parties (mean: 5, min: 0, max: 10); free access after the moving wall as a counterpart to public funding.



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# The NUMDAM digital archive: contents

## Currently online

- *Ann. Inst. Fourier*
- *Ann. I.H.P.*
- *Ann. Math. Blaise Pascal*
- *Ann. Sci. Ecole norm.sup.*
- *Ann. univ. Grenoble*
- *Bull. Soc. math. France*
- *Mém. Soc. math. France*
- *Journées EDP*
- *Publ. Math. IHES*
- **Total: 216664 p. 7899 art.**

## Forthcoming

- *Ann. Fac. Sci. Toulouse*
- *Séminaires I.H.P.*
- *Sém. Bourbaki*
- *Ann. Gergonne*
- *Ann. I.H.P.Sér A*
- *Ann. I.H.P.Sér B*
- *Ann. I.H.P.Sér C*
- *Rev. Stat. appl.*
- *Ann. Fac.Sci. Univ. Clermont*
- *Ann. Scuola Norm. Pisa*
- *Compositio Math.*



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# The NUMDAM digital archive: principles

## ■ Integrity

- Full backrun, no editorial choice.
- Scan of every page at high resolution (600 dpi) black & white (text), grey or colour when applicable.
- Page format reproduced.
- Unicode metadata.
- Clean separation between faithful articles' image and added metadata (PDF/DjVu article vs. HTML navigation).

## ■ Interactivity

- Detailed structured metadata: basic bibliographical data plus full text and cited references.
- A hyperlink network places the article in proper context: bibliographies, reviews, errata, etc.

[Lempert, László](#)**Approximation de fonctions holomorphes d'un nombre infini de variables.** *Annales de l'institut Fourier*, [49](#) no. 4 (1999), p. 1293-1304Texte intégral [djvu](#) | [pdf](#) | Analyses [MR 2001d:32027](#) | [Zbl 0944.46046](#) | [2 citations dans NUMDAM](#)

## Résumé

Soit  $X$  un espace de Banach complexe, et notons  $B(R) \subset X$  la boule de rayon  $R$  centrée en  $0$ . On considère le problème d'approximation suivant: étant donnés  $0 < r < R$ ,  $\varepsilon > 0$  et une fonction  $f$  holomorphe dans  $B(R)$ , existe-t-il toujours une fonction  $g$ , holomorphe dans  $X$ , telle que  $|f - g| < \varepsilon$  sur  $B(r)$ ? On démontre que c'est bien le cas si  $X$  est l'espace  $l^1$  des suites sommables.

Abstract and reference list are part of metadata

## Bibliographie

[B1] L. BUNGART, **Holomorphic functions with values in locally convex spaces and applications to integral formulas**, *Trans. Amer. Math. Soc.* [1902](#)[B2] L. BUNGART, **Errata to volume 1902**

Record and reference list both contain links

[D1] S. DINEEN, **Complex Analysis in Locally Convex Spaces**, North Holland, Amsterdam, 1981. [MR 84b:46050](#) | [Zbl 0484.46044](#)[D2] S. DINEEN, **Complex Analysis on Infinite Dimensional Spaces**, Springer, Berlin, 1999. [MR 2001a:46043](#) | [Zbl 01321183](#)[DS] N. DUNFORD, T. SCHWARTZ, **Linear Operators I.**, John Wiley & Sons, New York, 1988.[L] L. LEMPERT, **The Dolbeault complex in infinite dimensions**, II, à paraître, *J. Amer. Math. Soc.* [Zbl 0926.32048](#)[N] P. NOVERRAZ, **Pseudo-convexité**, convexité polynomiale et domaines d'holomorphic en dimension infinie, North Holland, Amsterdam, 1973. [Zbl 0251.46049](#)[R] R.A. RYAN, **Holomorphic mappings in  $l_1$** , *Trans. Amer. Math. Soc.*, 302 (1987), 797-811. [MR 88h:46089](#) | [Zbl 0637.46045](#)





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# The NUMDAM digital archive: new features

- Enhanced search engine :
  - linked page numbers for words in full text
  - option to search expressions present on the same page
- Full Catalogue available through OAIPMH
  - [www.numdam.org/oai](http://www.numdam.org/oai)
- Browsing interface « cloaked » for web crawlers
- Links from MathSciNet, Zentralblatt, RBSM, google, Yahoo, OAI aggregators



See [www.numdam.org](http://www.numdam.org)

Elizabeth CHERHAL-CLEVERLY, Laure HEÏGÉAS



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# GALLICA Front Math

- BnF has a large digitization program (Gallica).
  - Journal de Maths Pures et Appliquées
  - Many monographs
  - Collected works of remarkable mathematicians
  - But.... only volume-level metadata
- The Front Math provides « article level » metadata for the contents of complete works,
  - easy web browsing
  - each « article » will have a stable URL
  - « articles » will be indexed in mini-DML.
- An interesting partnership with BnF

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publishing of  
mathematics



Cauchy - Œuvres complètes, série 2, tome 1 gallica

Augustin-Louis Cauchy  
[Recherches sur les polyèdres : premier mémoire](#) p. 7-25  
Journal de l'École polytechnique, XVIIe cahier, t. IX, p. 68; 1813

Augustin-Louis Cauchy  
[Sur les polygones et les polyèdres : second mémoire](#) p. 26-38  
Journal de l'École polytechnique, XVIIe cahier, t. IX, p. 87; 1813

Augustin-Louis Cauchy  
[Recherches sur les nombres](#) p. 39-63  
Journal de l'École polytechnique, XVIIe cahier, t. IX, p. 99; 1813

Augustin-Louis Cauchy  
[Mémoire sur le nombre des valeurs qu'une fonction peut acquérir lorsqu'on y permute de toutes les manières possibles les quantités qu'elle renferme](#) p. 64-90  
Journal de l'École polytechnique, XVIIe cahier, t. X, p. 1; 1815

Augustin-Louis Cauchy  
[Mémoire sur les fonctions qui ne peuvent obtenir que deux valeurs égales et de signes contraires par suite des transpositions opérées entre les variables qu'elles renferment](#) p. 91-169  
Journal de l'École polytechnique, XVIIe cahier, t. X, p. --; 1815  
[Table of content](#)

Augustin-Louis Cauchy  
[Mémoire sur la détermination du nombre des racines réelles dans les équations algébriques](#) p. 170-257  
Journal de l'École polytechnique, XVIIe cahier, t. X, p. 457; 1815  
[Table of contents](#)

Augustin-Louis Cauchy  
[Sur les racines imaginaires des équations](#) p. 258-263  
Journal de l'École polytechnique, XVIIIe cahier, t. XI, p. 411; 1820



gallica

Augustin-Louis Cauchy

[Mémoire sur les fonctions qui ne peuvent obtenir que deux valeurs égales et de signes contraires par suite des transpositions opérées entre les variables qu'elles renferment](#)  
[Œuvres complètes, série 2, tome 1](#), 91-169  
Journal de l'École polytechnique, XVIIe cahier, t. X, p. --; 1815

- [Première partie. Considérations générales sur les fonctions symétriques alternées](#) xci
- [Deuxième partie. Des fonctions symétriques alternées désignées sous le nom de Déterminants](#) cxiii
  - [Première section. Des déterminants en général et des systèmes symétriques](#) cxiii
  - [Deuxième section. Des systèmes d'équations symétriques et de leurs déterminants](#) cxxviii
  - [Troisième section. Des systèmes de quantités dérivées et de leurs déterminants](#) cliii
  - [Quatrième section. Des systèmes d'équations dérivées et de leurs déterminants](#) clxi

Easy browsing

Indexed in mini-DML



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•NUMDAM


•GALLICA

•CEDRAM

•MiniDML

# CEDRAM - Background

- Many first class mathematical journals
- « Home » published and minimal means
- ▶▶ Needs of advanced electronic publishing

- CNRS supporting 
- NUMDAM for old papers
- CEDRAM
  - Centre de Diffusion de Revues Académiques Mathématiques
  - Center for Diffusion of Academic Mathematics Journals

▶▶ Partner for low-cost independent journals

EIPub conference,  
Leuven, 8th June 2005



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# CEDRAM - Purpose

## ■ Technologies of NUMDAM

- ▶▶ Browsing, searching, cross linking
- ▶▶ Abstract, keywords and MSC

## ■ Some more : technical platform for e-publishing

- ▶▶ Data flows and formats
- ▶▶ Maintenance and archiving

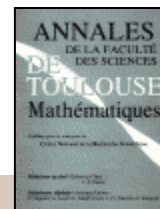
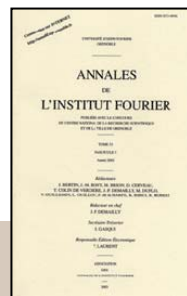
# CEDRAM - Economic model

## ■ Related journals

▶▶ *Annales de l'Institut Fourier*

▶▶ *Bulletin de la Société Mathématique de France*

▶▶ *Soon Annales de la Faculté des Sciences de Toulouse*

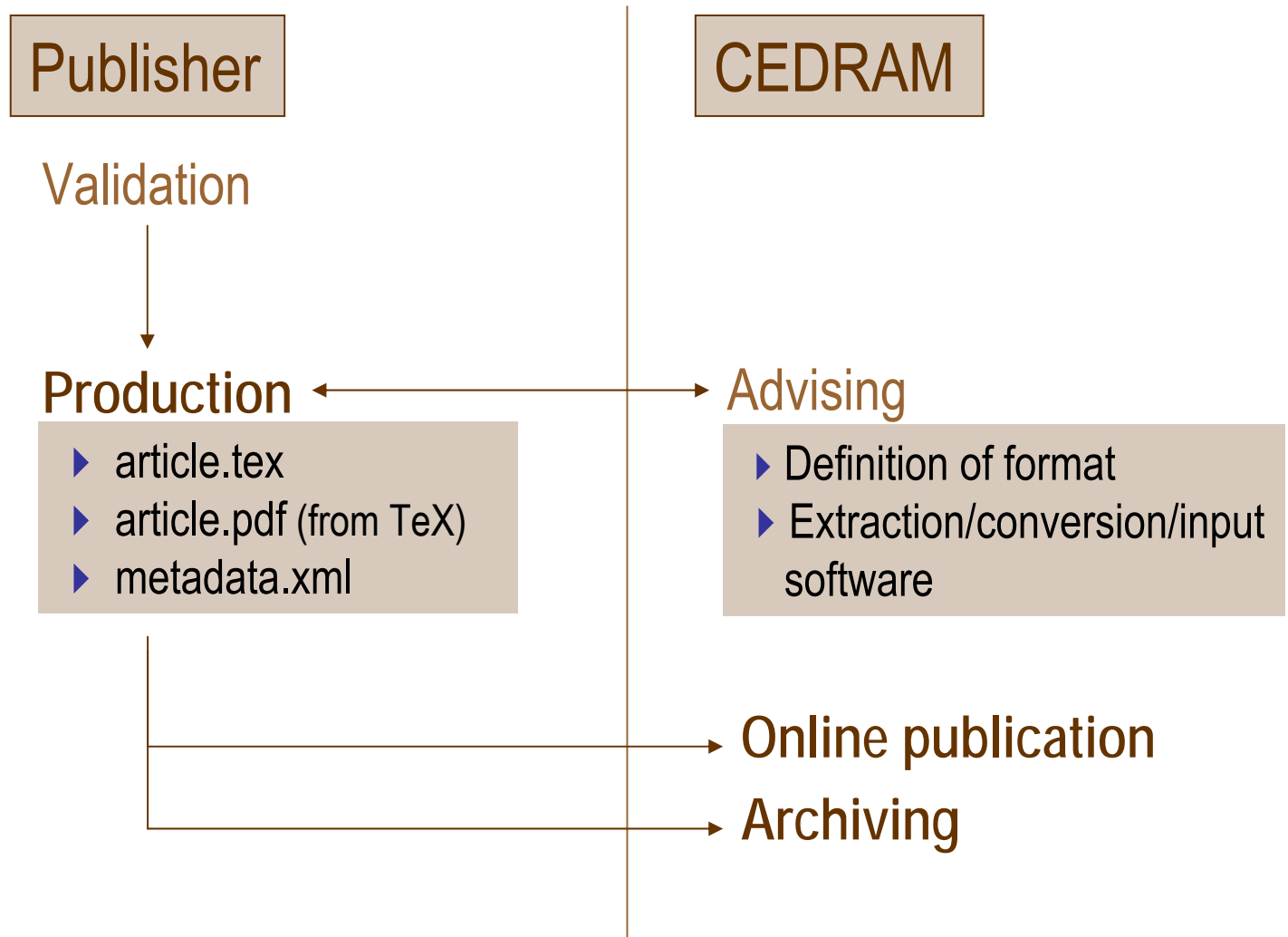


## ■ Economic model

▶▶ Subscription to paper and e-version

▶▶ Moving-wall

# CEDRAM - Workflow

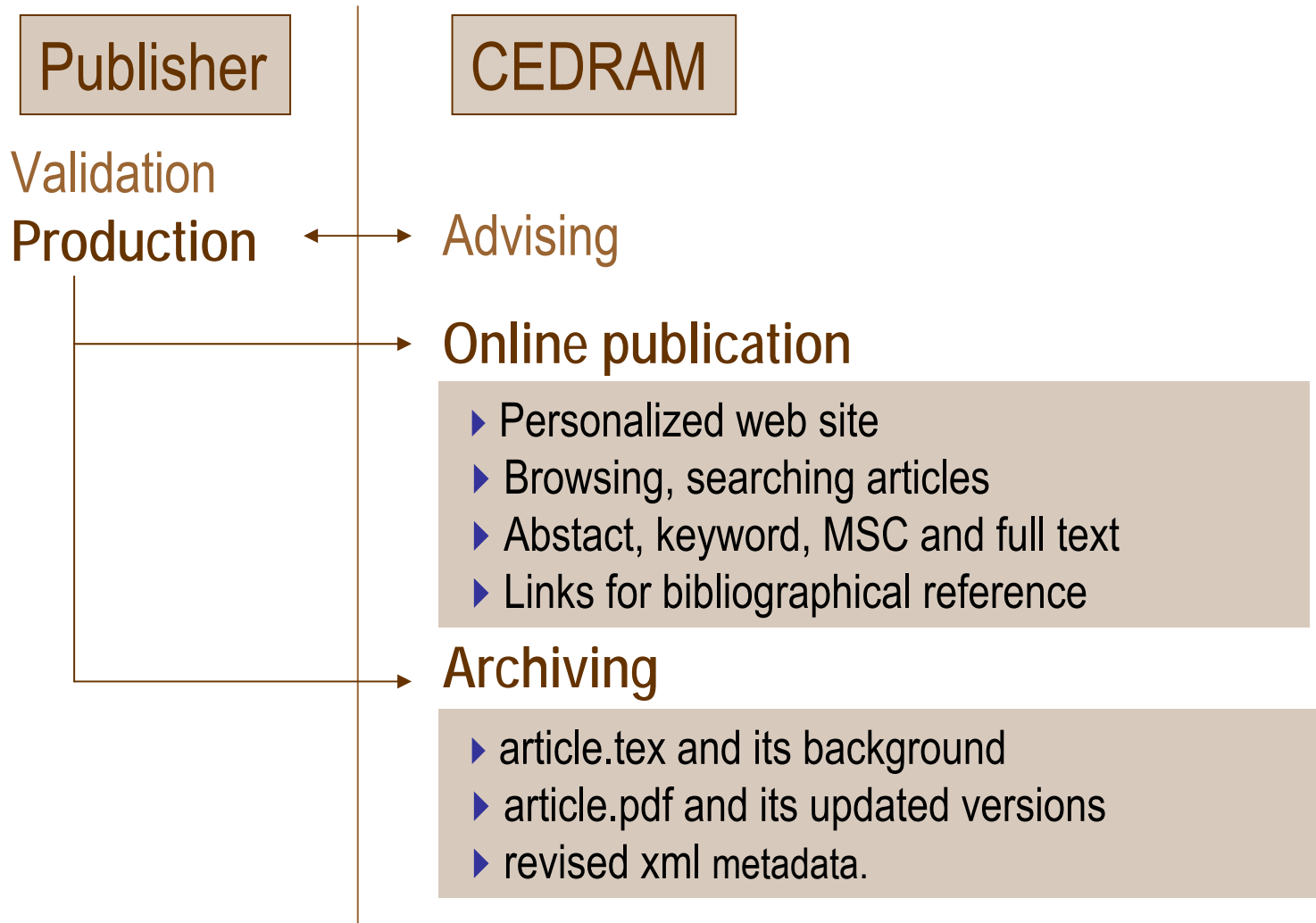




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# CEDRAM - Workflow



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# CEDRAM - To conclude

- Preserving the journal's image
- Unifying workflow (open and well documented standards)

▶▶ High quality online publication

- Links from ZentralBlatt and MathSciNet
- Metadata exposed via OAI
- Indexation in Google

▶▶ Portal as visible as possible



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# The mini-DML project: all this and lots more...

- **The name:** DML : Digital Math Library Mini : not everything available yet
  - No ambition to contend with reviewing services
- **The aim:** Unified indexation of articles available in digital format, taking advantage of XML/OAIPMH technology
- **Special emphasis on :**
  - long run journals, sometimes not available in review databases
  - digitally available texts seldom explicitly referenced (reprints, collected works, preprints, current issues)
- **Metadata from:** home-grown catalogues ([NUMDAM](#), [Gallica](#)) OAI servers (Euclid, arXiv,... ), less structured sources (HTML tables of contents, OCRed tables of contents, ...)

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# The mini-DML project

<http://www.numdam.org/minidml/>



Author

Title words

Date

Anywhere

22 matches

1 2

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Siu, Yum-Tong  
 **$\bar{\partial}$ -Regularity for weakly pseudoconvex domains in complex Hermitian symmetric spaces with respect to invariant metrics**  
 Ann. of Math. 156 (2002), no. 2, 595-621  
[Article \(Euclid\)](#)

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Mostow, G.D.; Siu, Yum-Tong  
**A compact Kähler surface of negative curvature not covered by the ball.**  
 Ann. of Math. 112, no. 2, 321-360 (1980)  
[Article \(Jstor - subscription required\)](#)

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Siu, Y.T.  
**A Hartogs type extension theorem for coherent analytic sheaves.**  
 Ann. of Math. 93, 166-188 (1971)  
[Article \(Jstor - subscription required\)](#)

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Siu, Yum-Tong, Yeung, Sai-Ke  
**Addendum to "Defects for ample divisors of abelian varieties, Schwarz lemma, and hyperbolic hypersurfaces of low degrees,"** American Journal of Mathematics 119 (1997), 1139-1172  
[Article \(arXiv - Preprints\)](#)

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Siu, Yum-Tong  
**An effective Matsusaka Big Theorem**  
 Ann. Inst. Fourier 43, no. 5, 1387-1405 (1993)  
[Article \(Numdam\)](#)

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Siu, Yum-Tong, Yau, Shing-Tung  
**Complete Kähler manifolds with nonpositive curvature of faster than quadratic decay.**  
 Ann. of Math. 105, no. 2, 225-264 (1977)  
[Article \(Jstor - subscription required\)](#)

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Siu, Yum-Tong  
**Curvature characterization of hyperquadrics**  
 Duke Math. J. 47 (1980), no. 3, 641-654  
[Article \(Euclid\)](#)

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Siu, Yum-Tong  
**Defect relations for holomorphic maps between spaces of different dimensions**  
 Duke Math. J. 55 (1987), no. 1, 213-251



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# Mini-DML: share metadata, build digital libraries

- To be indexed: share metadata
  - adopt a stable URL system or OpenURL resolver
  - have some metadata available for displaying without having to download the article
  - set up an OAI server
    - ♦ Tools available at <http://www.openarchives.org/tools/tools.html>
    - ♦ Use the oai\_dc schema or better...
    - ♦ minidml XML schema (to be improved) available at <http://www.numdam.org/OAI/minidml.xsd>



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# Thank You !

## ■ References:

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- *Bouche, Thierry.* - [NUMDAM and other digitisation activities at MathDoc, CEIC](#) (Committee on Electronic Information and Communication), Grenoble, 11 mars 2005
- *Cherhal, Elizabeth.* - "Numérisation/conservation partagée : la collaboration BnF/Cellule MathDoc ; pistes de travail pour de nouveaux services". Table ronde, Journées des pôles associés, BnF, Paris,. 1 Juillet 2004
- MathDoc: see <http://www-mathdoc.ujf-grenoble.fr>
- NUMDAM: see <http://www.numdam.org>
- OAI : see <http://www.openarchives.org>
- Project Euclid: see <http://projecteuclid.org>