From on-line publications to digitised collections: in favor of the emergence of true digital libraries

Des publications en ligne aux archives numérisées, pour l'émergence de véritables « bibliothèques numériques »

Pierre Bérard
Université Joseph Fourier

Évolution des publications scientifiques : le regard des chercheurs

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From on-line publications to digitised collections: in favor of the emergence of true digital libraries

Note:

I will mainly talk on documentation issues for Mathematics. I believe that the main issues are relevant for other fields as well.

The considerations mentioned in this presentation are underlying the actions of the mathematical community and in particular the national programmes NUMDAM and CEDRAM led by Cellule MathDoc (UJF – CNRS).

Mathematics and its scholarly literature

- Mathematical literature does not become obsolete
  - Mathematics has flourished along the past 2 500 years because key literature was passed from generation to generation.
- ML constitutes both a corpus and a wide network
  - Ideas and techniques from decades or centuries ago are relevant, sometimes crucial, for solving contemporary problems in mathematics or for applying mathematics to other sciences and to technology.
- ML is used (mathematics, other sciences, technology) in an asynchronous fashion.

Mathematics and its scholarly literature: an overview

1800	About 200 scientific journals containing mathematics (~15 in 1700)
1850	About 1000 research mathematics papers published per year
2000	50% of citations were published in the last 10 years, and 25% of citations were published more than 20 years ago. Publication delays, about 1-2 years.
1810	Annales de Gergonne (1810-1832) Digitised
1826	Crelle's journal - Journal für die reine und eingewandte Mathematik Digitised
1836	Liouville's journal - Journal de mathématiques pures et appliquées Digitised
1994	New York Journal of Mathematics (the first electronic general math. journal)
1991	arXiv (1992 for mathematics, with 58 900 + 6 900 papers to date)
1868	Jahrbuch über die Fortschritte der Mathematik (1868–1942) Digitised and included into Zentralblatt MATH
1894	Répertoire Bibliographique des Sciences Mathématiques (1894–1912) Digitised
1931	Zentralblatt-für Mathematik und ihre Grenzgebiete (1931 $\Longrightarrow$) Became Zentralblatt MATH under the EMS auspices Digitised / Digital
1942	Mathematical reviews (1942 $\Longrightarrow$) Digitised / Digital
1952	Mathematics section, Referativnyi Zhurnal (1952 $\Longrightarrow$)
2000	75 000 items reviewed / 100 000 items analysed per year (MR or ZM) 600 journals reviewed cover-to-cover ; 1 500 journals analysed, books, ...
2000	Links to full text (born digital or digitised) Bibliographies of reviewed items (including cross linking) inserted in reviews

Questions being raised in the mathematical community

- Institutional repositories vs formal journals.
- Who pays for electronic-only free access journals?
- Does the author-pay model help improve the quality?
- Does the author-pay model help lower global costs?
- Will independent publishers survive?
- Long term reliability of digital libraries: who will maintain the digital files after their commercial life?

What do mathematicians need?

(mathematicians and users of mathematics)

- Mathematicians need reliable sources.
- Mathematicians need to have access to the scholarly literature on the long-term.
- Mathematicians need organisation and linking.

What do mathematicians need?

(mathematicians and users of mathematics)

- The International Mathematical Union – IMU has endorsed the recommendations issued by its Committee on Electronic Information and Communication

  Best Current Practices
  www.ceic.math.ca/Publications/Recommendations/BPs.pdf

  to be referred to as IMU-BCP.

Mathematicians need reliable sources

- Because mathematics so much depends on its past literature, journals have played a major role since their emergence in the 18th century by providing validation and storage of key mathematical pieces.
  - Diversity of independent, and often long-standing, reputable peer-reviewed journals $\Rightarrow$ robustness, high scientific quality, improved service, ...

Mathematicians need reliable sources

- The digital age has brought new opportunities – from archival e-print servers to purely electronic journals – to disseminate and access literature.
- At the same time, publication and validation are becoming increasingly detached.

- *Our main concern, for the long-term welfare of mathematics, is to preserve the diversity of well identified reliable sources.*

Mathematicians need reliable sources

IMU-BCP Recommendation 9

Validation.
Publication and peer review processes are increasingly detached. The emergence of overlay journals, archival preprint servers, and other new structures of publication raise new and pressing questions about the appropriate forms of validation. These are important issues for all scholarship, but even more important for mathematics since it is essential to know which parts of the mathematical literature are valid.

Both mathematicians and decision makers need to be alert to the distinction between posting and providing validation. Editorial boards should be explicit about the form and the level of validation they provide for papers and make this information plain to all users.

Mathematicians need to have access to the scholarly literature on the long-term

- Because mathematics so heavily depends on its past literature, preservation and archiving are of prime importance.
- Libraries have up to now played a central role by providing preservation and archiving of print material. Our main concern today is of a political nature.
- Who will in the future be responsible for preserving and archiving the digital mathematical heritage?

Mathematicians need to have access to the scholarly literature on the long-term

- Libraries have not only cared for preservation and archiving. They have provided long-term access for their patrons and, more generally, for the general public.

- Will the mathematical production remain part of our common, freely accessible, heritage or will it be gradually confiscated by private interests?

Long-term access: risks

- Long-term economic barriers (free access after more than 50 years ; in mathematics a 5-year barrier could be a compromise between commercial and scientific interests).
- Technical barriers (obsolete formats, DRM).
- Financial barriers (viability of / for economic agents).

Long-term access

IMU-BCP Recommendation 11

Partial access.

Many journals restrict access to (paying) subscribers. As the web of mathematical literature grows, however, it will be increasingly important for all mathematicians to navigate that web, whether or not they have access to complete articles. This allows mathematicians to obtain basic information about an article, even when they do not belong to institutions with the financial resources to subscribe to a given journal. As such, it is especially advantageous to mathematicians from the developing world.

Journals should provide unrestricted access to tables of contents, abstracts of papers, and other data, such as keywords. Where practical, journals should also provide unrestricted access to reference lists with links, allowing all mathematicians to navigate the web of literature, even when they don't have access to the full-text of some parts of that web.

Long-term access

IMU-BCP Recommendation 12

Eventual free access.

The scholarly enterprise rests on the free exchange of ideas, and scholars need to have easy access to those ideas. Many journals, however, rely on subscriptions to recover costs and to provide an incentive to publish, forcing them to limit access to subscribers. Access should be a balance between those two needs, of scholars and of publishers.

Limiting access to subscribers for a fixed period of time after publication may be necessary for many journals. In order to ensure appropriate accessibility for the electronic literature, we encourage all journals to grant free access after that fixed period of time.

Long-term access

IMU-BCP Recommendation 13

Archiving format.

Ensuring the success of long-term archiving is more than storing the electronic data on reliable media in multiple locations. As software and formats change in the future, the data will require modification and updating. Not all electronic formats are suitable for these purposes.

In general, electronic documents should be stored in their most primitive format, that is, the format used to derive subsequent formats. Any format in which material is stored should follow an "open standard" that has a detailed public specification. This will increase the likelihood that scholars working decades or centuries from now will be able to use the material.

Long-term access

IMU-BCP Recommendation 14

Archiving Responsibility.

Traditionally, maintaining the older literature has been the responsibility of librarians rather than publishers. Even in the electronic age, scholars and the librarians who represent them have the greatest motivation among all of the affected parties to ensure the preservation of older material.

We recommend that electronic archives of the mathematical literature should ultimately be under the control of the academic community.

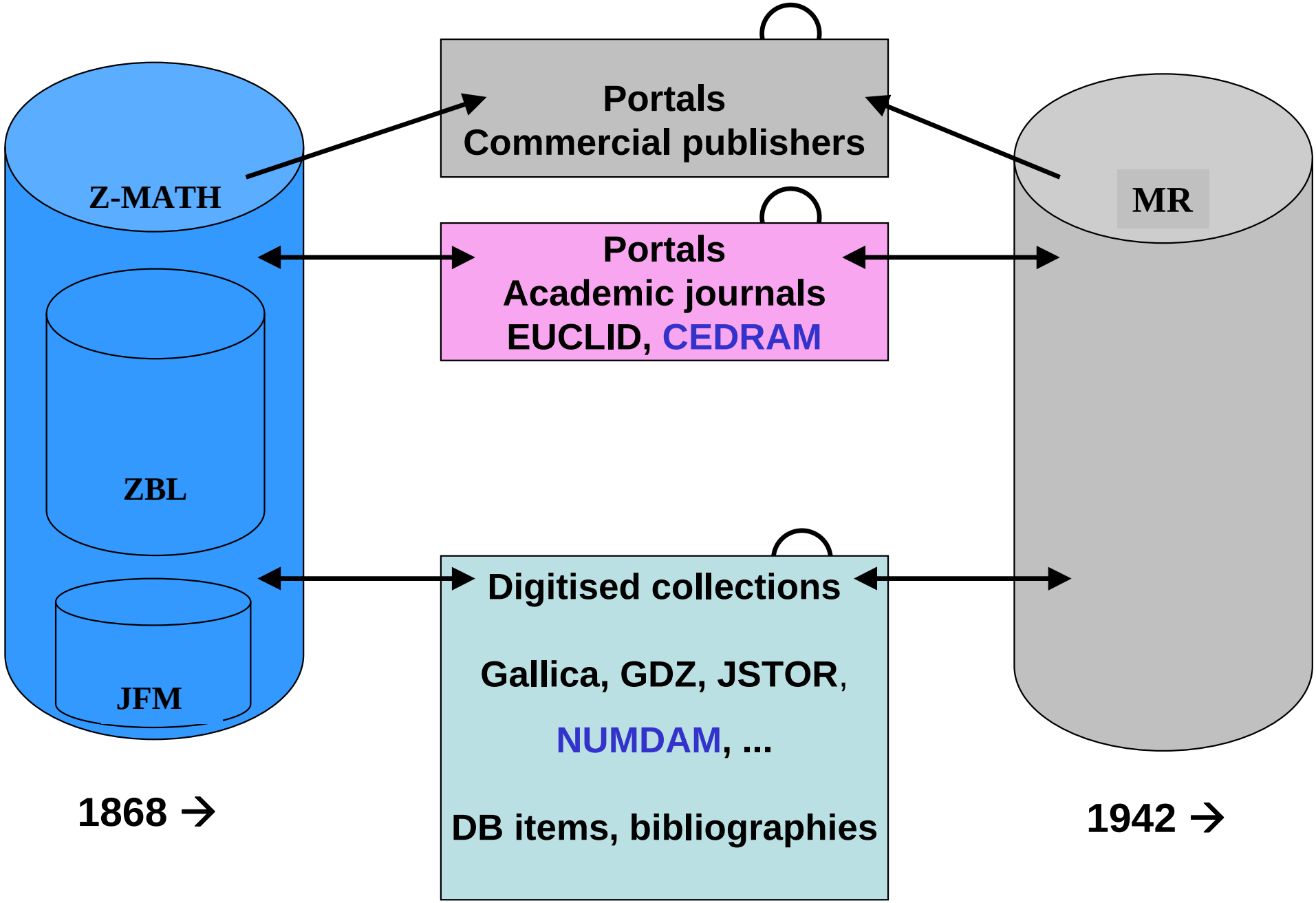
Mathematicians need organisation and linking

The need for tools to organise and approach a growing scholarly literature was soon recognised by mathematicians (and others).

This led to the emergence of specialised databases together with indexation, classification schemes, reviews and, with the digital era, cross-linking.

Mathematicians need organisation and linking

- Jahrbuch über die Fortschritte der Mathematik (1868–1942), established by Carl Ohrtmann and Felix Müller.
- Répertoire Bibliographique des Sciences Mathématiques (1894–1912), established by the Société mathématique de France and chaired by Henri Poincaré.
- Zentralblatt-für Mathematik und ihre Grenzgebiete (1931 $\Rightarrow$), established by Otto Neugebauer .
- Mathematical reviews (1942 $\Rightarrow$), founded by the American Mathematical Society under the incentive of Otto Neugebauer.
- Mathematics section, Referativnyi Zhurnal (1952 $\Rightarrow$).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1942 →

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Deligne, Pierre

La conjecture de Weil. I. (French)

Inst. Hautes Études Sci. Publ. Math. No. 43 (1974), 273--307.

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From References: 147
From Reviews: 54

This is without question the most important paper in algebraic geometry to have appeared in the last ten years (since H. Hironaka's proof of resolution of singularities in characteristic zero [Ann. of Math. (2) **79** (1964), 109--203; ibid. (2) **79** (1964), 205--326; MR0199184 (33 \#7333)]). Deligne

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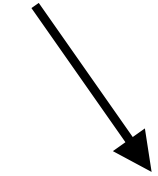

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Line bundles on complex tori and a conjecture of Kodaira.

Comment. Math. Helv. 80 (2005), no. 2, 229--242.
32Q15 (32G20 32J27)

A compact Kähler manifold is called almost algebraic if it can be approximated by smooth projective varieties. K. Kodaira proved in \ref[Ann. of Math. (2) **78** (1963), 1--40; MR0184257 (32 \#1730)] that every Kähler surface is almost algebraic. The statement that this should be true also in higher dimensions is known as the Kodaira conjecture. Recently, C. Voisin \ref["On the homotopy types of Kähler manifolds and the birational Kodaira problem", preprint, \url{arxiv.org/abs/math/0410040}] and K. Oguiso \ref["Automorphisms of hyperkähler manifolds in the view of topological entropy", preprint, \url{arxiv.org/abs/math/0407476}] constructed counterexamples by constructing rigid non-algebraic Kähler threefolds. The present paper, which was completed before the counterexamples appeared, gives some observations concerning the Kodaira conjecture. A certain blow-up of a ${\Bbb P}^3_1$-bundle over a 3-dimensional complex torus with Picard number ≥3 is shown to be rigid. It turns out, however, that these complex tori are algebraic. Some interesting generalizations are also considered.

Reviewed by H. Lange

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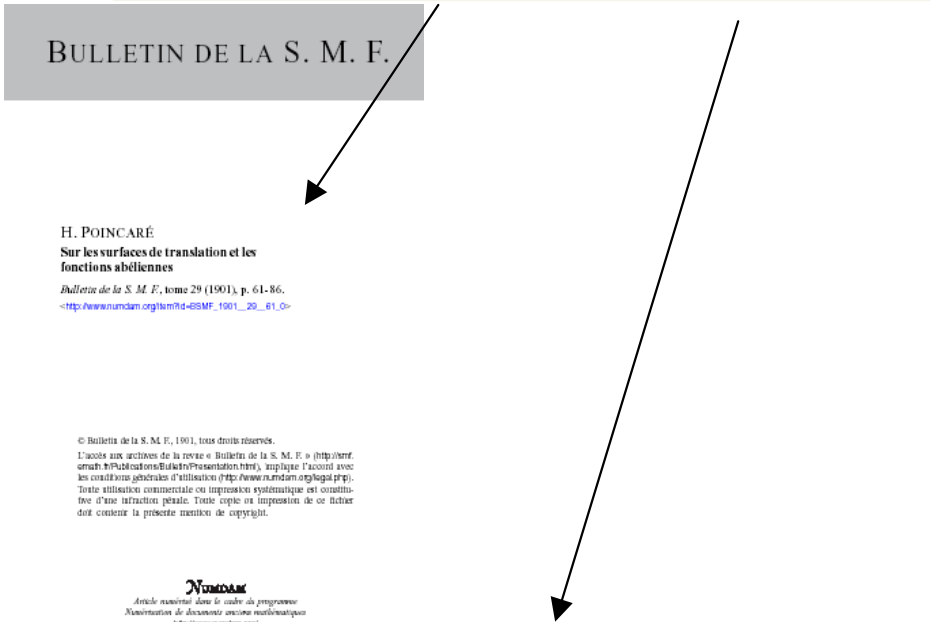
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Published: (1901)
Die zu einem algebraischen Gebilde vom Geschlecht p gehörige {\it Riemann}sche Thetafunktion verschwindet, wenn für ihre Argumente Summen von $p-1$ Integralen gesetzt werden. Betrachtet man die p Argumente als Punktkoordinaten eines Raumes von p Dimensionen, die $p- 1$ oberen Grenzpunkte der Integrale aber als bewegliche Parameter, so ist dadurch eine Oberfläche definiert, welche wegen der besonderen Form der Ausdrücke für die Koordinaten als Summen von Funktionen je eines Parameters translativ genannt wird. Da die Argumente immer noch auf eine zweite Weise als Summe von $p- 1$ Integralen dargestellt werden können, ist die definierte Oberfläche doppelt translativ. Es wird gezeigt, dass\ die so erhaltenen doppelt translativen Oberflächen die einzigen überhaupt existierenden sind.
[Krazer, Prof. (Karlsruhe)]
Subject heading: Siebenter Abschnitt. Funktionentheorie. Kapitel 2. Besondere Funktionen. C) Hyperelliptische, Abelsche und verwandte Funktionen.

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The rank problems for webs $W (d, k, n)$ of codimension n, given on a (kn)-dimensional differentiable manifold by d foliations of codimension n in general position, are: (1) to find an upper bound for the n-rank, and (2) to describe webs of maximum n-rank. The author describes the d-webs $W(d, 2, n)$ of maximum n-rank. \par The main result of the paper is the following. For $d \geq n+3 \geq 5$, any web $W(d, 2, n)$ of maximum n-rank is algebraizable, i.e., it is equivalent to an algebraic web $AW (d, 2, n)$ generated by an algebraic hypersurface V^n of degree n in the projective space P^{n+1}. For $n = 2$, this result matches the reviewer's result for webs $W(d, 2, 2)$ of maximum 2-rank [see {\it V. V. Goldberg}, C. R. Acad. Sci., Paris, Sér. I 297, 339-342 (1983; Zbl 0539.53012); Colloq. Math. Soc. János Bolyai 56, 317-357 (1992; Zbl 0789.53008); or Section 8.3 of the reviewer's book ``Theory of multicodimensional $(n+1)$-webs" (Mathematics and its Applications 44, Kluwer, Dordrecht) (1988; Zbl 0668.53001)].
[**Vladislav V.Goldberg (Newark/New Jersey)**]

MSC 2000:
*53A60 Geometry of webs

Keywords: web; rank problem; algebraizability
Citations: Zbl 0539.53012; Zbl 0789.53008; Zbl 0668.53001

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- a long-lasting public service offering
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  - Long-term access.
  - Organisation and linking.

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- NUMDAM – Mini-DML & CEDRAM
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- See the coming presentation by T. Bouche
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Thank you for your attention

Prof. Pierre Bérard
Université Joseph Fourier – Grenoble
Institut Fourier – Mathématiques, UJF – CNRS
B.P. 74, 38402 Saint Martin d'Hères

Pierre.Berard@ujf-grenoble.fr