

# Editorial: Opportunities and Challenges in Electronic Publication

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Exactly a year ago, Bernard Teissier started his editorial in this newsletter claiming: “The advent of electronic publication has been changing our documentation practices for a quarter of a century.” This is perfectly true. The changes have had a positive impact; they offer new possibilities but they also generate many new questions, difficulties, problems and challenges.

A simplistic opinion has spread that “electronic” publication has made it fast and easy. Undoubtedly electronic devices, the internet and TeX and other typesetting and imaging tools have greatly improved the technical quality of prints, facilitated the exchange and circulation of manuscripts, supported author collaboration, increased the speed of preparation of documents and contributed to the ever growing volume of scholarly literature produced in mathematics. To handle this burst requires sophisticated tools, thoughtful arrangements and new paradigms. It is the task of the Electronic Publishing Committee of the EMS<sup>1</sup> to follow closely the developments in this area and derive suggestions helping to build the appropriate electronic infrastructures.

TeX is wonderful if one knows how to use it. However, authors mostly learn TeX by trial and error and TeX allows a great deal of improper creativity. To get a satisfying appearance and printing quality often requires a lot of editorial work by the publisher, which cannot be safely avoided even if the publisher requires the use of a particular style. To reach an overall consensus on a publishing style is absolutely impossible but creating a reasonable platform which could be used by a variety of small publishers might be effective. A successful example of this kind is the French project CEDRAM. Recently, there have been other community attempts like the Episciences platform<sup>2</sup> and a project proposal in preparation by FIZ Karlsruhe to add Publishing Platform features to the ELibM.

The more complex the electronic publishing ecosystem, the more important the question of permanence of documents and their long-term preservation. The development is going in the natural and probably best direction that electronic resources are distributed in different places. However, this makes the problem more complex. Preservation of printed texts has already been proved. Of course, there are deterrent examples like the Library of Alexandria or the novel “The Name of the Rose” by Umberto Eco. And we cannot be sure that the documents currently printed with the new technologies on cheap (acid) paper will be legible after one or two centuries. In any case, to destroy a server or even to delete a file is much easier and faster than to put a library to fire and much faster than the degradation of paper and chemical

ink. Archiving should be ensured primarily by the document producers – publishers, authors and their institutions. But the safety of archives must be considerably increased by proper technical tools and arrangements, backlogging, duplications, mirror sites, etc. There are commercial organisations like Portico and programmes like LOCKSS which publishers and libraries can use to archive their digital collections.

For ease of creating and handling electronic documents, we are paying a serious price: the fight against ever growing plagiarism and doubtful publishing practices.<sup>3</sup> It is an ethical problem which also requires efficient systemic and technical measures. Publishers should promote strict ethical rules and implement policies and efficient tools preventing and revealing plagiarism. While there are technical tools available to indicate suspicious papers, the vast majority of the revealed cases are due to community efforts, by the work of editors, referees, reviewers and even bloggers. The reason is both in the nature of mathematics – mathematics content is usually not suitable for solely text-based analysis – and in technical circumstances (many plagiarism cases are copied from older non-digital material, sometimes even from advanced text-books!). It is crucial to have independent platforms that document manifestations of plagiarism and doubtful publications sustainably. The reviewing services in mathematics have fulfilled this role for many years and evolved into modern databases which offer a powerful tool to detect and keep records of these issues.

The quickly developing environment of electronic publishing offers numerous opportunities, some of which can be achieved relatively soon and some rather in the realm of visions for farther future. Interlinking of documents, databases and other information resources is becoming standard. One click may lead the reader directly to another source of information either inside or outside the document and the reader would be rather surprised if a newborn electronic document did not provide such a possibility. Structured search through databases and digital libraries is a commonly required feature, which does not appear automatically. Its proper functioning depends mainly on quality metadata enhanced according to widely accepted standards. This is a nontrivial task requesting a lot of “hand-made” work, which is starting at publish-

<sup>1</sup> [http://mathsci.ucd.ie/~tpunger/EPC\\_EMS/](http://mathsci.ucd.ie/~tpunger/EPC_EMS/).

<sup>2</sup> J. Demailly: Episciences: A Publishing Platform for Open Archive Overlay Journals, *EMS Newsletter* 87, 31–32.

<sup>3</sup> Some examples were outlined in the discussion “Open Access – Four Opinions”, *EMS Newsletter* 91, 39–43.

ers and possibly ending at the creator of a digital library, and by no means all issues pertaining efficient and reliable identifier generation can be considered to be solved. While document identifiers exist in a stable framework, author identifiers are just about to evolve into an integrated network, and this issue for other relevant objects (like terms, definitions, theorems, etc.) is completely open. Until this is solved, search through full-texts in mathematics represents a tough task because they are rich in mathematical expressions, formulas, diagrams and other creatures difficult to interpret. There exist more-or-less efficient tools for searching mathematical formulas, e.g. the MIA S (Math Indexer and Searcher) developed at Masaryk University in Brno.

Linkage to social networking sites, from the most common Facebook and Twitter to the specialised Mendeley, CiteULike and BibSonomy, represents another interesting direction of development. Apparently, it has not yet found wide acceptance among mathematicians but the younger generation may change that soon. The same can be said for annotations – systems for blogging, providing comments to the displayed texts, managing discussion threads, enabling personalisation of the tools, etc.

A new feature emerging in electronic journals, in particular those devoted to applications of mathematics, is that papers have attachments in different formats, e.g. software, animations, videos and experimental datasets. This puts new requirements on electronic archives, digital libraries, metadata schemes and display methods. Questions often appear on how to handle so-called grey literature, informally published material such as reports, blogs and manuscripts that may be difficult to trace in conventional ways because they are neither published commercially nor widely accessible. This is a complex problem requiring special treatment which may not fit into the basic scheme of digital libraries.

Many other visionary ideas have been presented in the recent report “Developing a 21st Century Global Library for Mathematics Research”, initiated by the IMU and the US National Research Committee and supported by the Alfred P. Sloan Foundation.<sup>4</sup>

The foreseen features mostly assume semantically enriched texts. To provide them requires not only technical equipment but also an efficient organisation and voluntary cooperation of stakeholders: authors, publishers and content providers.

There is a successful example of a facility where some of the ideas have already been turned into reality: the European Digital Mathematics Library (EuDML), created as a pilot project partly funded by the European Commission from February 2010 to January 2013.<sup>5</sup> The EuDML represents a technical infrastructure providing a unified access point for the digital mathematical content hosted by a number of different organisations across various countries and a cooperation model with a variety of stakeholders allowing the building of a reliable, enduring, global reference library to eventually become exhaustive. The EuDML has developed a detailed scheme for quality, standardised metadata and a central system for enhancing metadata of local content providers. One

of the basic principles in the EuDML Policy requires that all items included in the EuDML must be open access after a finite embargo period. Once documents contributed to the library are made open access due to this policy, they cannot revert to closed access later on.

The EuDML provides interlinking between items and links to the databases zbMATH and MathSciNet. It offers users a linkage to various social networking sites. Registered users can enjoy features such as the annotations component and personalisation of the library. This is also the space where users could be dragged into active participation. The search through metadata and full-texts also includes search for formulas. The tools are still being developed and reliability of the outputs is limited by the technical quality of digital documents. Of course, we cannot expect too much of scans of old prints.

To ensure that these resources and services remain stable and there is a sustainable public service to the worldwide scientific community, it is crucial that they remain under public control. To this purpose, the international association without legal personality called the EuDML Initiative was established in 2014 by 12 partnering organisations including the EMS. The EMS plays an eminent role, which is supported by the fact that three members of the Electronic Publishing Committee became members of the association Executive Board and the EMS will nominate the Scientific Advisory Board. Thierry Bouche from the Cellule MathDoc in Grenoble is the Chair of the Initiative and Aleksander Nowiński from the ICM in Warsaw is in charge of the Technical Committee. The first tasks of the association include improving the technology built during the project, developing workflow to ease providing content into the EuDML, reviewing automatic metadata harvesting and ingesting, and enhancing the annotation service and formula search. In order to increase the amount of content, negotiations will continue with Euclid, Math-Net.Ru and in particular the EMS Publishing House about ingesting their collections. Archiving and long-term preservation is an important issue in the EuDML. According to its policy, the digital full-text of each item contributed to EuDML must be archived physically at one of the EuDML member institutions. The initiative will investigate creating a private LOCKSS network which might offer a prototype for further content providers, especially smaller publishers and member societies.

Naturally, all these activities generate costs. EuDML partners agreed that during the next few years they will use their own resources to cover expenses. There is an urgent task to create a long-term funding strategy. Research and development funding mostly aims at new developments and little attention is paid to the fact that the established facilities also have necessary running costs, not to mention that the project funding itself is not a reliable resource for long-term activities. The EuDML represents an important infrastructure for mathematics in

<sup>4</sup> Available at [http://www.nap.edu/catalog.php?record\\_id=18619](http://www.nap.edu/catalog.php?record_id=18619).

<sup>5</sup> See T. Bouche: Introducing EuDML, the European Digital Mathematics Library, *EMS Newsletter* 76, 11–16.

Europe and as such – perhaps together with zbMATH, the recently established EU-MATH-IN, etc. – it deserves sustainable support.

In a nutshell, another resource maintained by the EMS may illustrate how future semantic enrichment may work. The Encyclopedia of Mathematics (EoM)<sup>6</sup> has evolved into an open access, community-driven network of specialised mathematics information, which is now gradually linked both to the MSC as well as to relevant publications. In this way, the EoM is somewhat orthogonal to databases and digital libraries. The desirable interlinking between both kinds of resources is just beginning: at a document level, there already exist some (but not complete) links from the EoM to MathSciNet and zbMATH (and hence, through the latter, to EuDML) but not in the opposite direction. A complete interlinking from EuDML would be most useful if generated on the level of full-texts but this also represents the most demanding issue.

The progress in the domain of electronic publishing is moving ever faster. It is difficult to guess what will happen in a few decades and to formulate a firm universal and long-term strategy. We have to carefully follow the situation. Most of the issues mentioned above demand development of reasonable common standards and for-

<sup>6</sup> <http://www.encyclopediaofmath.org>.

mulation of best practice principles, which should then be promoted by the EMS and its member societies.

It is natural that many of the features mentioned here have been in the scope of the Electronic Publishing Committee. The members of the current committee as well as their predecessors have been personally involved in the EuDML, EoM, zbMATH and other activities connected with electronic publishing, archiving and dissemination of digital mathematical literature.



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## New Editor Appointed



**Vladimir Kostic** is an assistant professor at the Department of Mathematics and Informatics, Faculty of Science, University of Novi Sad. After obtaining his PhD in numerical mathematics in Novi Sad, he did postdoctoral research at the Technical University of Berlin. His main research interests cover subjects in numerical and applied linear algebra, modelling and optimisation of dynamical systems, and stability and synchronisation of dynamical systems – especially networks of oscillators as well as biological and artificial neural networks. Among his other professional activities, he has been a member of the organising committees of five scientific meetings. His webpage can be accessed at <http://sites.pmf.uns.ac.rs/vladimir.kostic>.

### A Note of Clarification from the EMS Executive Committee

This concerns the announcement of the new Editorial Board of JEMS published in the June 2014 issue of the EMS Newsletter.

A remark was received pointing out that the paragraph “The EMS is greatly indebted to the departing editorial board, which under the leadership of Professor Brézis has raised the journal to its current high rank”, might lead to the interpretation that the rank of the journal was low under the first editorial board, with Professor Jürgen Jost as Editor in Chief.

With this note, we would like to make clear that this would not reflect the opinion of the Executive Committee. Acknowledgement to the founding editorial board is clearly expressed in the sentences “Today, JEMS is one of the strongest mathematical journals, thanks to the skill and dedication of the first two editorial boards”.

EMS Executive Committee