

Chapter 6

Digital math libraries and the commitment to open access at zbMATH

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In addition to providing open access to the reviews at zbMATH Open, zbMATH attempts to connect articles within its database with online digital versions. This is to be seen, for instance, in the DOI and arXiv links on an article's information page at zbmath.org. A goal of zbMATH Open is not just to provide a link to a digital version of an article, whose full-text may be off-limits to non-subscribers of a particular journal, but also to provide an open access link to the article whenever possible. The ideal case would be the DOI pointing to the digital version at an open access journal, but an often well-suited alternative is to link to a preprint on an open access preprint server.

Furthermore, the potential to provide digital mathematical content is significant. Based on [2], we can estimate that more than 60% of around 130 million pages of math research since 1868 is digitally available. The use of DOIs has become a standard method to identify digital content, and the emergence of repositories such as arXiv, EuDML, Gallica, JSTOR, Math-Net.ru, or Project Euclid has enhanced the access to math articles and preprints.

In the case of linking to open access journals, several considerations must be made. For instance, the stability of the journal must be taken into account (change of publisher, change in open access policy of publisher, discontinuation of journal could all affect access to digital content), and even if there are no changes in a journal, the journal's open access policy could present some problems. In some cases there is a "moving wall" policy, so that access to an article is only available after some period of time.

Peer-review is essential to ensuring a standard and quality of mathematical research, and mathematicians consider the quality peer-review the most important asset of a journal [3]. In that sense, the open access policy of a journal may not come into consideration when an author is publishing research. Self-archiving on a repository or on another website in this situation becomes an important tool in open access; this type of open access, where an author publishes a document, and self-archives is known as "green" open access. Of course, the question of what to do with historical publications published before the time of preprint servers remains. In this regard, moving walls (eventually making a publication open access) on the part of journals or publishers is an important step, and such goals are being increasingly adopted and

encouraged by EuDML, ProjectEuclid, and MathNet.Ru. But in light of the peer-review concerns of mathematicians, encouraging publishers to adopt open access policies, where the journal provides open access to an article seems to be essential in moving towards open access. Even here, though, some distinctions between types of open access need to be kept in mind. In some cases, journals agree to an open access policy for digital content in exchange for an article processing charge (APC); such access is characterized as “gold.” While APC journals account for most of the growth of open access journal publications, they rarely fall into the category of core mathematics journals, which are defined to relate solely to mathematical content and belong to the top two indices in [4]. An open access journal which provides access without issuing additional charges is termed “platinum” or “diamond,” where additional costs are usually picked up by a third party, such as a large institution or library. While the advantages of such a policy is clear (no obstacles on the part of the author to providing access to research), the financial obstacles are obvious; funding has to come from somewhere, and that funding has to be stable. Still, the impact of green open access is most significant; it basically accounts for all progress made in open access share in core mathematics journals during the last two decades [1]. This evolution can be seen in Figure 1.

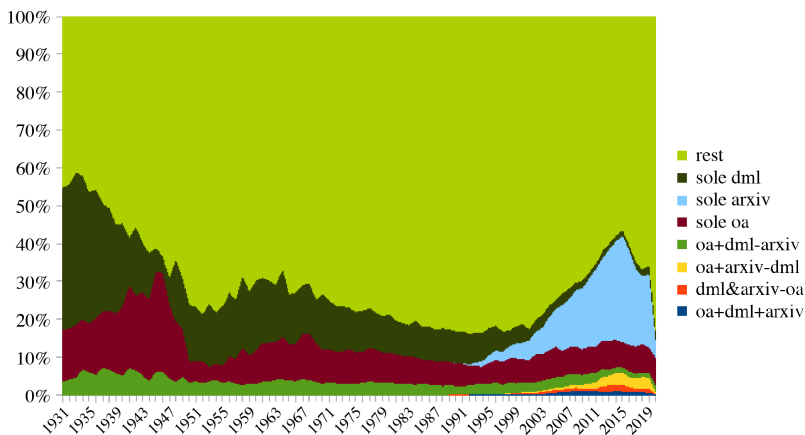


Figure 1. Share of different open access solutions/combinations in core math electronic journals (defined below) by publication years.

While the repositories mentioned above can be considered to be relatively stable, the argument can be made towards the usefulness of starting a repository to collect digital content found on sites deemed to be “unstable” (for instance a preprint on a homepage of an individual author). In such a scenario, zBMATH would take on responsibility to provide links and open access to preprints, or in some cases to

digital content from journals, of selected articles. Beyond storage and digital repository software concerns, effort would have to be made to ensure that no digital content runs counter to copyright protections. Furthermore, keeping the repository up to date (replacing older versions of articles/preprints with the latest versions) is essential to good maintenance.

These concerns will be taken into consideration in zbMATH's endeavor to keep a digital repository of journal articles currently at EMIS,¹ the goal being to link to an internal repository, when possible and if necessary (for instance in the case there is no journal link to an article), of an article when called from zbmath.org.

In the end, however, linking to digital content, as well as linking to open access versions either via external or internal repositories greatly enhances zbMATH's efforts into providing and supporting the distribution of open access math content.

References

- [1] D. Ehsani and O. Teschke, [On the road to a comprehensive open digital mathematics library](#). *Eur. Math. Soc. Newsl.* **118** (2020), 76–78
- [2] P. D. F. Ion and O. Teschke, Continuing toward a Global Digital Mathematics Library. Talk given at the *AMS Special Session on Mathematical Information in the Digital Age of Science at the Joint Mathematics Meetings*, San Diego, CA, 2018
- [3] C. Neylon, D. M. Roberts, and M. C. Wilson, [Results of a worldwide survey of mathematicians on journal reform](#). *Eur. Math. Soc. Newsl.* **103** (2017), 46–49
- [4] O. Teschke, [Green, gold, platinum, nickel: On the status of open access in mathematics](#). *Eur. Math. Soc. Newsl.* **110** (2018), 60–63

¹<https://www.emis.de>