

Zentralblatt MATH

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If someone had told me two years ago that I would become editor of Zentralblatt MATH, I would not have believed them. Of course I have known Zentralblatt since my time in Göttingen, when I was working on my diploma thesis. Later in Bonn, after my PhD thesis, I reviewed articles for Zentralblatt

for several years. I remained a regular user, first of the printed volumes and later of the online version, sometimes a critical one. Maybe that was the reason that I was asked to succeed Bernd Wegner, who had not only worked for 37 years as Editor-in-Chief but had also become the face of Zentralblatt MATH. During his term of office the age of electronic and online information started and it has not yet reached its peak. In fact, the development is extremely dynamic and nobody knows how the digital world will look like in, say, 10 or 20 years from now. In any case, Zentralblatt MATH is aware of the new challenges and ready to face them.

Zentralblatt as a community service

Zentralblatt MATH has three editorial institutions: the European Mathematical Society (EMS), FIZ Karlsruhe and the Heidelberger Akademie der Wissenschaften (Heidelberg Academy of Sciences). These are responsible for the content and for the running of the database (FIZ Karlsruhe). Springer-Verlag is the publisher, responsible for marketing, sales and invoicing and for the print version *Excerpts from Zentralblatt MATH*. As is well known, Springer is a commercial publisher and therefore many mathematicians believe that Zentralblatt makes a lot of money and that most of the profit goes to Springer.

However, I can say that this is definitely not the case. In fact, Springer has only a little share in Zentralblatt; the main partners are the non-profit organisations EMS, FIZ and the Heidelberg Academy. Mathematicians should be aware of this fact, which can also be seen from the rather generous offers:

- Free access for institutions of developing countries.
- Free access for every individual member of the EMS.
- Free access to the first three hits of any query for everybody.

Of course, Zentralblatt cannot be completely free, although most of us would perhaps wish it to be. Generating content and maintenance of the infrastructure, including the IT, are extremely costly. The Berlin office of Zentralblatt, for instance, has about 20 full-time employees who manage 120,000 items, drawn each year from more

than 3,500 journals and 1,100 serials. Moreover, about 6,000 reviewers all over the world write short abstracts of published papers with some additional information. These contributions are the main content of Zentralblatt MATH and it shows that Zentralblatt is a service from the community for the community of mathematicians.

Do we need more than one review service?

Many mathematicians ask this question, in particular when their library suffers severe budget cuts. I think there are good reasons why we should have more than one. It is never a good idea to be dependent on just one monopolist because then:

- There will be no competition for low prices.
- There will be no competition for complete and high quality content.
- There will be no competition for improving the product.
- There will be no independent control of bibliometric data.

Comparing MathSciNet and ZBMATH, it is easy to see that both have advantages and disadvantages. Zentralblatt is proud to offer access to more than 3 million records and thus to be the largest and most comprehensive reference database in mathematics. It is also the longest running reference database, as it contains data that date back more than 150 years – without doubt a great treasure (see the very instructive articles by S. Göbel, “Glimpses into the history of Zentralblatt MATH” in *80 Years of Zentralblatt MATH* by O. Teschke, B. Wegner, D. Werner (Editors), Springer 2011, and the abridged version “80th anniversary of Zentralblatt Math” in the *EMS Newsletter*, September 2011).

It is perhaps worth mentioning that MathSciNet and ZBMATH work together in several fields, e.g. identifying plagiarism and further developing the MSC classification scheme for mathematics. This shows that competition and collaboration can go together for the benefit of the mathematical community.

The European Mathematical Society, one of the main editors of Zentralblatt MATH, promotes the development of all aspects of mathematics in Europe and Zentralblatt MATH contributes to these promotional activities. It is important that European mathematicians especially take advantage of this fact and also support Zentralblatt in the future. The EMS Council, including its president, as well as the collaborators of Zentralblatt, including myself, are fully dedicated to the aim of making Zentralblatt a continuing success story.

New role of the review services

When I was a student and later an assistant, I used to go to the library once a week to make my own excerpts from articles in my field on small tabs, or to copy the review

from Zentralblatt or Math Reviews. For many years, this helped me to keep track of my area. Nowadays, mathematicians try to get the information online first before they go to the library, if at all.

The transformation of Zentralblatt into a reference database made online access possible and it is now used intensively by working mathematicians as a fast and reliable source of information. In many cases, the review of an article or of a book provides useful extra information. But besides this, the rather complete database allows an easy search for the most important publications in any area, specified by its MSC classification or related to given keywords. Facing an explosive growth in the number of publications, it is especially useful for young researchers to have well-prepared, selected and structured information, which differs from the greedy search engines. However, this is not obvious and it will be a challenge to convince young mathematicians to make even better use of the reviewing services.

Besides information about publications, the reference databases provide bibliometric data about individual authors through their author profiles and the use of these data is a growing trend. Although every mathematician knows that bibliometric data cannot substitute for peer reviewing, many mathematicians use these data as additional information. But this means that services providing such data have enormous influence and power.

In a sense, the author profiles from Zentralblatt MATH and MathSciNet have come to be used as a “rating agency” for mathematicians. Even if we do not like this, it is clear that we cannot stop this trend. But we have to be aware of it and stress its limitations.¹

Completeness and reliability

The problem of completeness for reference databases has been addressed in a recent article by Bernd Wegner (see B. Wegner, “Completeness of reference databases, old-fashioned or not?”, *EMS Newsletter*, June 2011). His statement “...complete reference services will very soon be the only integrating factor for the large variety of mathematical publications” is probably true. However, there are two questions concerning completeness and reliability: firstly, which articles have to be considered as mathematics and, secondly, which journals have a sufficiently high quality to be indexed?

Neither question is easy to answer nor can the answer be automated. For example, there are many new

journals in mathematics appearing every year and several of them claim to be peer-reviewed but are nothing more than a business model.

This means that completeness must always be balanced by quality. Having in mind that reference databases are also used to rate the scientific quality of a person, we see that this is of utmost importance. Ensuring completeness and reliability is one of the major tasks, to which Zentralblatt MATH dedicates great care.

Perspectives

The future of reference databases like ZBMATH or MathSciNet is not at all clear. We have seen that they provide very useful and valuable information that cannot be obtained from other sources, at least not with the same completeness and reliability. Of course, other sources like Google or Google Scholar, which are free, also provide information about scientific publications and even bibliometric data. However, it is my impression that the information given there is often not reliable. On the other hand, nowadays most people, including mathematicians, have become accustomed to using services like Google every day. Hence, they try to find full texts of publications there, even if they could have access to the full text via a reference database.

In any case, I am convinced that for ZBMATH and MathSciNet to survive they will have to add unique new features and services. These have to be based on and designed for electronic use and must be accessible online through the internet.

There are already some ideas on how to improve Zentralblatt MATH. As a first step, we would like to get systematic feedback from our users about their wishes and expectations. A poll will be organised together with the EMS. We will also put in some extra effort into improving the author profile of ZBMATH.

A new and, we hope, useful service is the SMATH project. Here we are creating an open access database on mathematical software, which will be linked with the reviews in ZBMATH. It addresses not only users of Zentralblatt but also anyone interested in mathematical software. For a more detailed description of SMATH see the article “Building an Information Service for Mathematical Software – the SMATH Project” in this Newsletter.

Some other innovative projects for ZBMATH have just started. I would like to mention the Deliver-Math project for enhanced and semi-automatic text analysis and the MathSearch project for indexing and searching mathematical formulas within ZBMATH. Other projects are planned. I think we can look forward to new and exciting developments within the next few years.

If you have any question or suggestion, please contact me at gruel@zentralblatt-math.org.

¹ When bibliometric data are the only source to rank scientists, the results can be very surprising, not to say wrong (see O. Teschke, “Negligible Numbers”, *EMS Newsletter*, December 2011). Moreover, depending on the data and the way that these are processed, the results can vary quite a lot (see O. Teschke, B. Wegner, “Author profiles at Zentralblatt MATH”, *EMS Newsletter*, March 2011).