Some Tools for Working with Bibliographic References

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Abstract. The rapid quantitative growth of scientific publications has pushed the development of various Internet tools for finding the necessary information. Statistics on its study and use (citation) are no less important than the search for the necessary information. This article explores the citation support tools provided by Google Academy, Crossref, and other developers. In the Russian Federation NEICON (a national consortium of Russian educational, scientific and cultural organizations) provides technical and methodological support for working with DOI and other Crossref services. The article shows how the considered tools are built into the user interfaces of the IPM electronic library. Additional features provided by these tools are considered.

Keywords: e-library, bibliographic link, back bibliographic link, toolbox.

1 Introduction

The rapid development of the Internet over the past 20 years has led to a significant increase in the accumulated scientific and technical information, a sharp increase in the number of electronic libraries and their volume.

The rapid quantitative growth of scientific publications has pushed the development of various Internet tools for finding the necessary information (for example, the Google Academy [1]). It should be noted that Google Academy has partnered with publishers to index peer-reviewed scientific articles and other academic materials, making them searchable on Google.

The Google Academy search base includes journals, conference proceedings, abstracts, dissertations, scientific books, preprints, technical reports, and other scientific literature from various fields of knowledge. In the Google Academy, you can find publications from many scientific publishers, professional communities, as well as research articles from various Internet sources.

From the point of view of real citation rates for Russian-speaking authors, Google-Academy is of possibly greater interest than Web of Science or Scopus, since it includes the maximum number of scientific journals in Russian.

No less important than the search for the necessary information is statistics on its study and use (citation) by other readers. This data is certainly of interest both to the author of the scientific publication and to network users who are interested in the article.

One of the developers of specialized tools for supporting citation was the Crossref association [2], which develops and maintains the world's high-tech infrastructure for scientific communications.

In the Russian Federation NEICON (a national consortium of Russian educational, scientific and cultural organizations) [3] provides technical and methodological support for working with DOI and other Crossref services.

The tools considered in the article are actively used by researchers and publishers around the world.

This article is devoted to the use of tools provided by Google-academy and Crossref for the development of technological capabilities of the Keldysh Institute of Applied Mathematics [4].

2 Crossref Association

The development of digital libraries as a source of information is inextricably linked with the history of the Internet. Scientific-technical and scientific-educational libraries occupy a special place among electronic libraries. World experience shows that educational and scientific electronic resources are formed, as a rule, by the scientific and educational organizations themselves in which the authors of these publications work, and they are focused primarily on readers who are also closely related to scientific and educational activities (researchers, teachers, graduate students, students).

The work of researchers within the framework of a certain scientific direction involves the active study of publications of other authors in this topic and the legal use of other people's materials (citation) when discussing within the framework of journal articles, scientific reports, etc.

The Crossref Association, of which the Keldysh Institute of Applied Mathematics has been a member since 2016, maintains a joint worldwide mutual citation service that functions as a kind of gateway between publishers' electronic platforms. This service does not store the full texts of scientific publications, but it enters into its database information about the relationship of publications using the Digital Object Identifier (DOI) technology, as well as metadata of published scientific materials.

The tools under development by Crossref (and some other organizations such as Google Scholar, Scopus and Web of Science that use different sources for their citation data) make it easier for both the author of the publication and the reader to find, cite, evaluate, reuse research results.

A dedicated team of Crossref developers (Crossref Labs [5]) creates and tests new technologies and services that may be of interest to the scientific community. Some of these experiments become new Crossref services. Others are being converted or absorbed by existing services.

3 Get references

A bibliographic reference is a collection of bibliographic information about a cited, considered or mentioned document in the text, necessary and sufficient for the general characterization, identification and search of the document. The ability of a potential reader to find this document and get acquainted with it depends on how accurately the author of the publication indicated information about the cited document in the link [6, 10]. And the first Crossref tool that we would like to introduce readers to is "Get persistent links": https://doi.crossref.org/simpleTextQuery

Fig. 1. Crossref pattern for finding DOI links.

If you copy and paste the bibliography into the suggested window, Crossref will try to match the specified publications with their metadata and return links with DOIs.

As an example, we will take the first 4 elements of the bibliography from the KIAM preprint No 16 (2020) [8]:

1. Ivanov D.S. i dr. Laboratornyj stend dlya modelirovaniya dvizheniya mikrosputnikov // Izvestiya RAN. Teoriya i sistemy upravleniya. 2018. № 1. C. 125–140.

2. Ivanov D. et al. Determination of disturbances acting on small satellite mock-up on air bearing table // Acta Astronaut. 2018. Vol. 142, p. 265-276.

3. Bindel' D. i dr. Laboratornyj stend dlya verifikacii algoritmov upravleniya gruppirovkoj sputnikov // Izvestiya RAN. Teoriya i sistemy upravleniya 2009. Vol. 48, № 5. C. 109–117.

4. Ovchinnikov M.Y. et al. Development, integrated investigation, laboratory and in-flight testing of Chibis-M microsatellite ADCS // Acta Astronaut. 2014. Vol. 93. P. 23–33.

After completing the above steps, we get:

1. Ivanov D.S. i dr. Laboratornyj stend dlya modelirovaniya dvizheniya mikrosputnikov // Izvestiya RAN. Teoriya i sistemy upravleniya. 2018. № 1. C. 125-140.

2. Ivanov D. et al. Determination of disturbances acting on small satellite mock-up on air bearing table // Acta Astronaut. 2018. Vol. 142, p. 265-276.
https://doi.org/10.1016/j.actaastro.2017.11.010

3. Bindel' D. i dr. Laboratornyj stend dlya verifikacii algoritmov upravleniya gruppirovkoj sputnikov // Izvestiya RAN. Teoriya i sistemy upravleniya 2009. Vol. 48, № 5. C. 109-117.

4. Ovchinnikov M.Y. et al. Development, integrated investigation, laboratory and in-flight testing of Chibis-M microsatellite ADCS // Acta Astronaut. 2014. Vol. 93. P. 23-33.
https://doi.org/10.1016/j.actaastro.2013.06.030

It should be noted that we did not receive a link for the first position of this list because we used transliteration (as is usually done for foreign publications). In the Russian version of this list, Crossref easily finds a link to this publication. The third bibliography is too old and has no DOI. Thus, by supplementing his list of references with DOI references, the author of the article can, firstly, make sure of the correctness of these links, and, secondly, help the reader find the cited article in one click, if it interests him. Crossref has several more tools for getting permalinks. For example, https://search.crossref.org/references.

When implementing these tools, the Crossref working group (Crossref Labs) developed and tested four approaches (algorithms) for DOI search, indexing a given bibliographic reference:

• the traditional approach based on parsing links;

• SBM (Based Matching with Validation) algorithm with a simple threshold, which searches for a reference string in a search engine and returns the first match for which the relevance score exceeds a predetermined threshold;

• Threshold normalized SBM algorithm, which searches for a reference string in a search engine and returns the first match if its relevance score divided by string length exceeds a predetermined threshold;

• Search-Based Matching with Validation (SBMV) algorithm, which first applies the normalized threshold SBM algorithm to select a set of candidate items, and a separate validation procedure is used to select the final target item.

In various Crossref tools (when loading content, when defining links, etc.), depending on the requirements of simplicity-complexity and efficiency-accuracy, one or another algorithm is used. But in any case, the author or an employee of the publishing house is advised to independently check the correctness of the recognition result of bibliographic records and the accuracy of the reference obtained.

4   Reverse bibliographic reference (Cited-by)

A reverse bibliography (Cited-by) is a bibliographic reference to a publication that links to a given article. The tools for building a reverse bibliographic list are being developed not only by Crossref, but others as well. For example, Google scholar. In the corresponding Google tool, it is enough to specify the URL of the article you are interested in as a query parameter and you can get a list of publications that link to it.

For example, the article by M.M. Gorbunov-Posadov "Internet activity as the duty of scientist" (https://keldysh.ru/gorbunov/duty.htm) is referenced by 69 publications (Fig. 2), a list of which can be obtained using a request

https://scholar.google.com/scholar?q=link:https://www.keldysh.ru/gorbunov/duty.htm

Fig. 2. Google Scholar Cited-by List.

KIAM employees, who support and develop the functional capabilities of the IPM electronic library [7–9], this feature – obtaining a reverse bibliographic list using Google Scholar – is built into the electronic bibliographic publication card (Fig. 3).

One of the Crossref tools that allows you to build a reverse bibliographic list (Cited-by) is called getForwardLinks and has the format:

https://doi.crossref.org/servlet/getForwardLinks?usr=[username]&pwd=[password]&doi=[DOI],

where the publisher's login and password (login and password in the Crossref database), as well as the DOI of the publication of interest are indicated. For example:
https://doi.crossref.org/servlet/getForward-
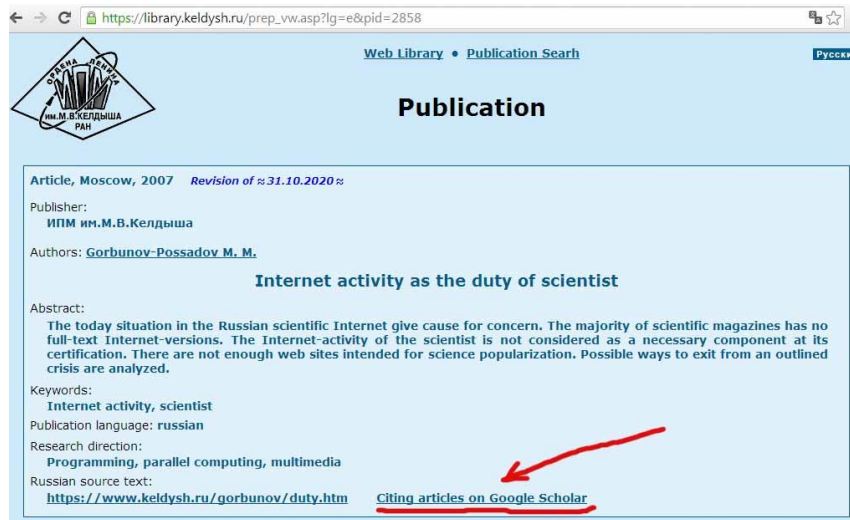Links?usr=kiam&pwd=XXX&doi=10.20948/prepr-2016-124

Fig. 3. Reverse bibliography link.

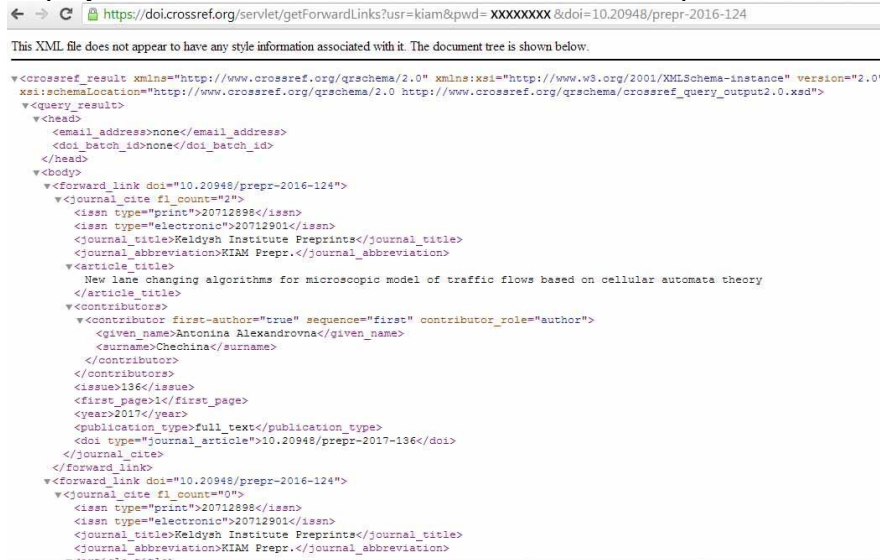The query result is returned in XML format. For the above example:

Fig. 4. The result of the request in XML format.

Another Crossref tool allows you to get information about publications linking to a specified article in JSON format (Fig 5).
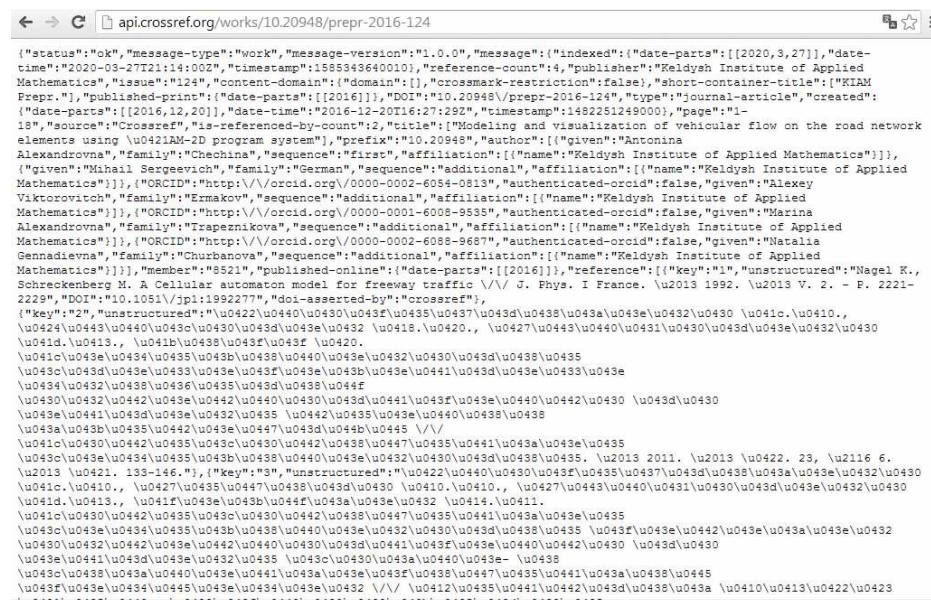

Fig. 5. Reverse bibliography in JSON format.

It is important to note that in this case there is no need for authorization.

At the moment we are working on connecting this function to the IPM electronic library. It should be noted that the reverse bibliography generated by GoogleAcademy and Crossref may differ as each tool uses its own database.

Another important addition comes from the fact that Crossref is one of the DOI recorders. And since DOI registrars do not exchange metadata, publishers associated with other registration services will not be able to use the Crossref tools.

5 Recent citations

In our opinion, one of the interesting possibilities associated with building a reverse bibliographic list is the setting of a time range. This may be of interest to authors and readers of "live publications" or publications that have undergone significant revisions. Those. authors (and readers) can find out whether the interest in the publication is growing, whether the changes made (or some events in the scientific world) influenced the citation of the article.

https://doi.crossref.org/servlet/getForwardLinks?usr=[username]&pwd=[password]&doi=[prefix]&startDate=[YYYY-MM-DD]&endDate=[YYYY-MM-DD]

6   Conclusions and Outlook

Various tools related to scientific publications and their bibliography have been developed and used for quite some time. For example, the Index of Citation of Scientific Articles, the total volume of citations, the Hirsch index, the impact factor, etc. But in our opinion, for authors and readers of scientific publications, it is important not only the quantitative (how many?), but also the qualitative (who?). Element of the list citations; and the ease of access to a specific article in a bibliography or reverse bibliography.

The citation support tools considered in this work are used to develop the technological capabilities of the IPM electronic library, and are partially embedded in the interface for working with the library.

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