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Current status of mathematical publications in Japan

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Abstract. In the present report, we show current status of mathematical journals in Japan. Because most of their electronic edition have been loaded on various digital repositories with support of OAI-PMH, we have been able to design a subject based portal website and visual user interface which consists of harvested metadata of the journals. The outline of the portal website is reported also.

1 Introduction

Many mathematical journals are published in Japan and most of them are indexed in Mathematical Reviews, however, there exists no catalog of them. We study the current status of the journals which is shown in Sect. 2.

The result in Sect. 2 indicates that most of the electronic edition of the journals are loaded on digital repositories with support of OAI-PMH [1]. It is natural idea to build a portal website which consists of harvested metadata from the repositories. We describe the features of the portal briefly in Sect. 3.

2 Current Status

In this section we briefly describe current status of mathematical publication in Japan. There exist hundreds of journal titles in Japan which is indexed in Mathematical Reviews. The journals contain about 70,000 articles.

There are three categories of the journals as the following: (1) International Journals, (2) Journals published by Mathematics Department, which contain mathematical articles only and (3) Publications by Faculty of Science, Education, Technology or Liberal Arts, which contain articles on other research fields.

Table 1 shows a part of the list of journal titles. The column labeled "Total" shows the number of articles of the title specified in "Title" column, "Platform" shows the platform of electronic edition of the title and "Current" shows whether the title is currently published or not. Blank "Platform" field shows that electronic edition does not exist. "J-STAGE" [5] is a platform operated as governmental services for electronic journals of academic community in Japan. "Project Euclid" [4] is well known for mathematicians. "Departmental web" means that the electronic edition is shown in the departmental webpages. "IR" means institutional repository of the university.

Table 1. Journal titles which have over 150 articles.

Total	Title	Platform	Current
7830	Surikaisekikenkyusho Kokyuroku	IR	y
2753	Proc Japan Acad	Project Euclid	y
2395	Proc Japan Acad Ser A Math Sci	Project Euclid	y
2391	J Math Soc Japan	Project Euclid	y
2357	Tohoku Math J	Project Euclid	y
2079	Nagoya Math J	Project Euclid	y
2010	Osaka J Math	Project Euclid	y
1679	J Math Kyoto Univ		y
1486	Publ Res Inst Math Sci	Project Euclid	y
1363	Sugaku		y
1242	Hiroshima Math J	Project Euclid	y
1082	Hokkaido Math J		y
1028	Funkcial Ekvac	J-STAGE	y
972	Kodai Math J	Project Euclid	y
952	Tokyo J Math	Project Euclid	y
915	Tsukuba J Math		y
898	Math J Okayama Univ	IR	y
897	Kodai Math Sem Rep	Project Euclid	n
656	J Fac Sci Univ Tokyo Sect IA Math	IR	n
652	Yokohama Math J		y
626	Mem Fac Sci Kyushu Univ Ser A	J-STAGE	n
547	Math Sem Notes Kobe Univ	Departmental web	n
498	Japan J Math	Springer	y
380	Japan J Indust Appl Math	Project Euclid	y
376	Kobe J Math	Departmental web	y
345	Proc Imp Acad Tokyo		n
315	Kyushu J Math	J-STAGE	y
297	J Math Sci Univ Tokyo	IR	y
271	Sci Rep Tokyo Kyoiku Daigaku Sect A		n
262	Nihonkai Math J	IR	y
244	SUT J Math	Departmental web	y
241	Osaka Math J	Project Euclid	n
219	Natur Sci Rep Ochanomizu Univ	IR	y
218	Mem Fac Sci Kochi Univ Ser A Math		y
211	Math J Toyama Univ		y
210	Fluid Dynam Res		y
206	J Fac Sci Univ Tokyo Sect I	IR	n
190	Mem Coll Sci Univ Kyoto Ser A Math		n
184	Sugaku Expositions		y
182	Bull Fac Sci Ibaraki Univ Ser A		y
178	Rep Statist Appl Res Un Japan Sci Engrs		y
172	J Fac Sci Hokkaido Univ Ser I		n
171	J Sci Hiroshima Univ Ser A I Math	Project Euclid	n
170	J Sci Hiroshima Univ Ser A		n
158	Japan J Appl Math		n

On one hand, the titles which contain more than 800 articles have their electronic edition. Most of them choose Project Euclid and J-STAGE as the platform and all of them are classified into category 1. SPARC JAPAN activity [3] have been supported 8 journals to load their electronic edition on Project Euclid. We can say that there exist central platforms for them. On the other hand, most of titles which contain no more than 800 articles are webpages of their department or institutional repositories (IR) of their university. These journals are classified into category 2 and 3. We can say that there exist various platforms for them.

In addition to the titles in Table 1, there are about 200 journals which contain no more than 150 articles. Our problem is to manage the huge titles of lower profile journals, which are classified in category 2 and 3.

From the viewpoint of Open Access movement, electronic edition of mathematical journals published in Japan is widely supported with Open Access community in Japan.

3 Subject Based Portal Website

Because these platforms, Project Euclid and IRs, support OAI-PMH, all metadata of these journal articles can be harvested in oai_dc format. Once the whole metadata is retrieved, we can construct simple subject portal for mathematical journals published in Japan. This work is partly supported by SPARC JAPAN.

Most of the mathematical journals published in Japan does not specify their scope of research fields. In a sense it is inconvenient for users who want to browse articles by subject areas. By that reason this portal is designed to be able to browse by Mathematics Subject Classification (MSC), not by journal title.

We choose the journals which contain over 800 articles for the portal from category 1 and 2. Because MSC is coded as a value of dc:subject tag in oai_dc metadata format, it is easy to build a subject based portal. Readers can access the portal at http://oaia.math.sci.hokudai.ac.jp/navi/jp/.

Furthermore, we prepare user interfaces through subject correlation maps by co-occurrence relation between MSC. The map is undirected finite graph where the node set is MSC. If one article specifies two MSC including MSC Secondary, one edge is set between the two nodes. As a result, a subject map is found for articles published in mathematical journals in Japan and the map represents a feature of the journals. For example, take two articles which specify more than three MSC: the one article specifies 32A36, 26D10 and 35K05, and the other article specifies 35P15, 58G25 and 53C42. From the two sets of MSC, we can construct a diagram as shown in Fig. 1 because 35 is a common classification between the two articles. The weight on an edge is defined as the number of articles which specify the two classifications.

By repeating this step for each article, we can get user interfaces as shown in Fig. 2, a screenshot of the portal website. When users select a subject classification from the correlation diagram on the right side of the screen by mouseover, the list of articles on the subject classification appears on the left side of the

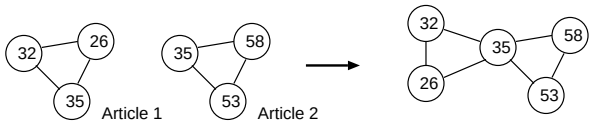


Fig. 1. An example of the process to construct the graph from two sets of MSC.

screen. Figure 3 is a simplified version of diagram in Fig. 2. Users can observe the relation among research fields in mathematics by the visual interface.

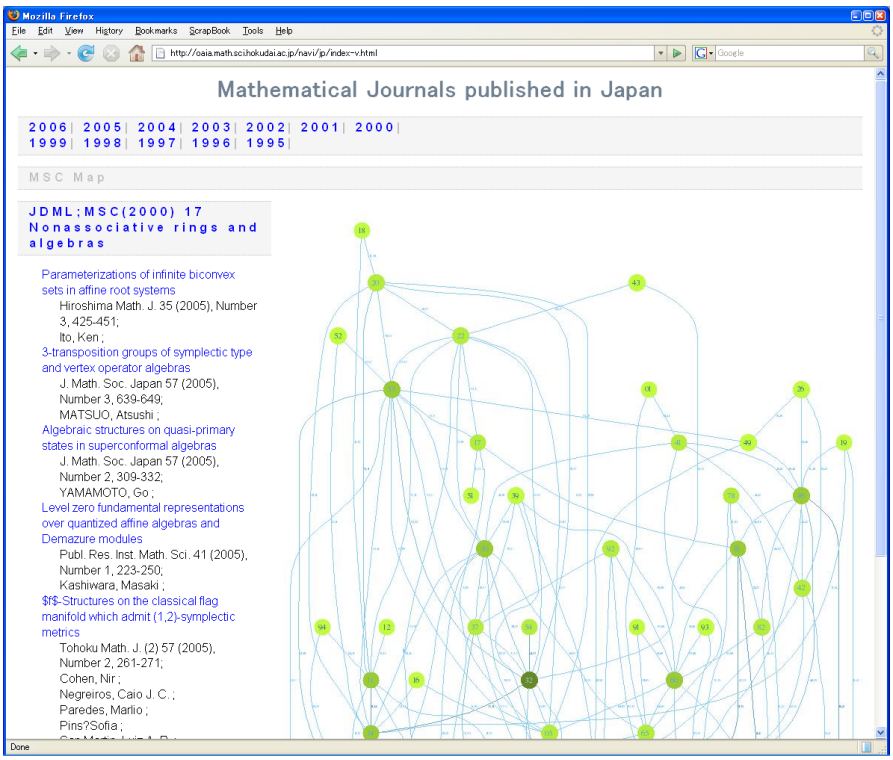


Fig. 2. Our portal website which consists of harvested metadata of the journals.

4 Discussion

We choose the journals which contain over 800 articles for the portal from category 1 and 2 because the journals of category 3 contain articles on other disciplines even if the journal titles are indexed in Mathematical Reviews. It is

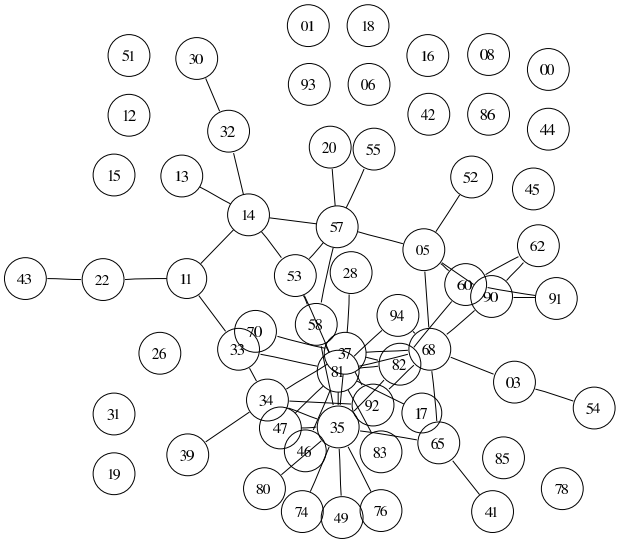


Fig. 3. Subject correlation diagram generated from the journal articles published in Japan.

difficult to retrieve mathematical articles only from category 3 journals because there are no fields which specify the research fields in metadata harvested from institutional repositories. The problem will be solved in our future work.

Finally we have a plan to construct OAI-ORE Resource Map [2] on the portal. If we have the resource map, everyone should make full use of our integrated resources.

References

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3. SPARC JAPAN http://www.nii.ac.jp/sparc/
4. Project EUCLID http://projecteuclid.org/
5. J-STAGE http://www.jstage.jst.go.jp/