Retrieval of Japanese Scientific and Technical Information from the JICST Online Information System†

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The Japan Information Center of Science and Technology (JICST) maintains a database that provides access to Japanese publications in a broad array of scientific and technical fields. For a number of years the information contained in this database has been available on-line to users outside Japan in two ways. The first involves remote login to the JICST Online Information System (JOIS) in Japan using international communication networks. The second involves the STN service to access JICST-E, an English-language derivative of a portion of the original Japanese database. In this paper we describe our experience in accessing JOIS from the United States using hardware and software commonly available in the United States.

1. INTRODUCTION

The Japan Information Center of Science and Technology (JICST) is a special, nonprofit corporation affiliated with the Science and Technology Agency (STA) of the Japanese government. Since 1957 JICST has been charged with collecting scientific and technical information on a worldwide scale, processing this information systematically, disseminating the information rapidly and appropriately to users, and cooperating with similar organizations throughout the world.[1,2] The principal services provided by JICST are abstracting, publication of these abstracts, maintaining an on-line database, publishing reference materials for efficient use of the database, document searching and photocopying, and document translation. For potential users outside Japan the most important of these services is the on-line database service, known as the JICST Online Information System (JOIS). This service, which began operation in 1976 and became available to overseas users in 1985, provides access to many of the files maintained by JICST and to certain files maintained by other organizations but distributed by JICST. A partial list of the files available to users in the United States appears in ref 2. Any of these files can be accessed by opening an account with JICST and by establishing the proper communication links. Guidelines and a detailed procedure for obtaining on-line access to JOIS using hardware and software readily available in the United States are available upon request from the authors.

2. JOIS FILES

Once access to JOIS has been obtained, it is necessary to select the files to be searched and to construct a search strategy for each file. By far the largest file is the JICST File on Science and Technology (JICST, File 010). This file includes more than 6 million citations drawn since 1981 from journals, reports, and conference preprints around the world. A typical search plan using JOIS would probably include searching the JICST file as well as other specialized files that would be appropriate for the specific topic under consideration. One file that is particularly useful for tracking current technical progress in Japan is the Nikkan Kogyo File on New Technology and Products in Japan (NK-MEDIA, File 070). Citations in this file are drawn from the database compiled by the *Nikkan Kogyo Shimbun*, one of the major industrial newspapers in Japan. This file includes citations from 1983 to date. Most of the files on JOIS have been designed to be searched in Japanese. The JICST File on Science, Technology and Medicine in Japan (JICST-E, File 510), however, is an English language file that is devoted exclusively to citations published in Japan. This file extends back to 1985, and includes citations drawn from both the JICST File on Science and Technology (File 010) and the JICST File on Medical Science in Japan (File 050). The JICST Quick File (JQUICK, File 030) may also be searched in English. The citations contained in this file will ultimately become part of the JICST file, but are gathered here in abbreviated form (titles and bibliographic data only; no keywords) to provide more rapid access to recently received documents. Citations in this file data back to 1990, but the real benefit from this file is gained for citations dating back in time about 6 months from the data of searching. Many citations in the JQUICK file include English titles, and some citations also include English abstracts written by the author(s). The other files on JOIS are also valuable, but further discussion in this paper will be restricted to the four files described here.

3. EXAMPLE SEARCH

The most effective way to describe our experience using JOIS is to provide an example. The topic selected for this example is that of conducting polymers and polymer batteries. The search consists of two sections: part A includes terms that are related to the general concept of conducting polymers; part B contains terms that are related to polymer batteries, which represent one of the most important industrial applications for conducting polymers. A list of terms to be used for a Japanese language search was compiled and is shown as Figure 1. A corresponding set of terms to be used for an English language search appears in Figure 2. In compiling these lists it was of course necessary to know the Japanese and English terms that are commonly used by specialists in the

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Part A
導電性高分子 ★
伝導性高分子
導電性ポリマ
導電性ポリマ&
伝導性ポリマ
伝導性ポリマ&
導電性プラスチック
導電性プラスチック&
伝導性プラスチック
伝導性プラスチック&
高分子伝導体
有機伝導体 ★
高分子半導体 ★
有機半導体 ★

Part B
高分子電池
高分子&電池
高分子バッテリー
高分子&バッテリー
ポリマ電池
ポリマ&電池
ポリマバッテリー
ポリマ&バッテリー
プラスチック電池
プラスチック&電池
プラスチックバッテリー
プラスチック&バッテリー
ペーパ電池
ペーパ&電池
ペーパバッテリー
ペーパ&バッテリー
有機電池
有機&電池
有機バッテリー
有機&バッテリー

Figure 1. List of search terms when searching in Japanese.

Part A
ELECTROCONDUCTIVE POLYMER ★
ELECTROCONDUCTIVE[W]POLYMER&
CONDUCT&[W]POLYMER&
CONDUCT&[W]PLASTIC&
POLYMER&[W]CONDUCTOR&
ORGANIC CONDUCTOR ★
ORGANIC[W]CONDUCTOR&
POLYMERIC SEMICONDUCTOR ★
POLYMER&[W]SEMICONDUCTOR&
ORGANIC SEMICONDUCTOR ★
ORGANIC[W]SEMICONDUCTOR&

Part B
POLYMER[W]BATTER&
POLYMER&[W]BATTER&
POLYMER&[1W]BATTER&

PLASTIC[W]BATTER&
PLASTIC[1W]BATTER&

PAPER[W]BATTER&
PAPER[1W]BATTER&

ORGANIC[W]BATTER&
ORGANIC[1W]BATTER&

Figure 2. List of search terms when searching in English.

field and to translate each term into the other language as accurately as possible. It was also important to include the specific terms related to this topic that appear in the controlled vocabulary of keywords (descriptors), both in Japanese and in English. In this regard the reference works[3-12] published by JICST were indispensable. Those terms in Figure 1 or Figure 2 that are included in the *JICST Thesaurus* (Japanese or English) are indicated with a star. Normally, when searching any of the files on JOIS, our initial iteration includes a search of controlled terms (keywords), free terms, and single words from the title and abstract of each citation in the file.

		JICST FILE 010	JQUICK FILE 030	NK-MEDIA FILE 070
導電性高分子 ★		2147	175	112
伝導性高分子		15	9	0
導電性ポリマ		44	0	0
導電性ポリマ&		75	37	2
伝導性ポリマ		2	0	0
伝導性ポリマ&		5	0	0
導電性プラスチック		94	7	1
導電性プラスチック&		104	10	1
伝導性プラスチック		1	0	0
伝導性プラスチック&		1	0	0
高分子伝導体		0	0	0
有機伝導体 ★		647	25	0
高分子半導体 ★		88	2	0
有機半導体 ★		428	24	27
SUBTOTAL A	[LN=JA, 79%]	2756	277	139
高分子電池		8	0	0
高分子&電池		18	1	0
高分子バッテリー		5	0	0
高分子&バッテリー		5	0	0
ポリマ電池		12	0	0
ポリマ&電池		24	6	4
ポリマバッテリー		4	0	0
ポリマ&バッテリー		6	3	1
プラスチック電池		19	1	0
プラスチック&電池		20	1	0
プラスチックバッテリー		0	0	0
プラスチック&バッテリー		0	0	0
ペーパ電池		2	0	0
ペーパ&電池		13	2	1
ペーパバッテリー		0	0	0
ペーパ&バッテリー		1	1	0
有機電池		4	0	0
有機&電池		40	14	0
有機バッテリー		0	0	0
有機&バッテリー		0	0	0
SUBTOTAL B	[LN=JA, 94%]	118	28	6
TOTAL (A+B)		2815	304	146
LN=JA		2233	302	146
%LN=JA		79%	99%	100%

Figure 3. Search results when searching in Japanese.

The keywords are those terms listed in the *JICST Thesaurus* and appear within the KW field; free terms are words added by the abstractor and appear in a separate FT field. The importance of including in the list of search terms the appropriate terms from the *JICST Thesaurus* cannot be overemphasized. In this example, although the most common term used in the United States to describe such materials may be "conducting polymers" or "conductive polymers," the official JICST term is "electroconductive polymers". Failure to include this specific term in the list of search terms allows the possibility of overlooking potentially valuable citations for which the desired term appears only in the KW field. Some searches produce disappointing results for exactly this reason.

4. SEARCH RESULTS

Once the list of search terms for this example had been compiled, a very simple search strategy was established. The citations identified using each term were linked with a logical "or" to obtain a subtotal for part A and another subtotal for part B. Parts A and B were then joined with another logical "or" to obtain the total number of citations for the topic. The Japanese search was carried out on three files: the JICST file (010), the JQUICK file (030), and the NK-MEDIA file (070). The English search was conducted using the JICST file (010), the JQUICK file, and the JICST-E file (510). The results for the Japanese searches have been compiled in Figure 3; the results from the English searches appear in Figure 4. Because the JICST file and the JQUICK file both contain citations published outside Japan, the number of citations identified for each term was reduced by restricting the search to citations published in Japan (NA = JPN). Thus, all of the numbers that appear in Figures 3 and 4 refer to citations originating

	JICST FILE 010	JQUICK FILE 030	JICST-E FILE 510	JICST-E STN
ELECTROCONDUCTIVE POLYMER ★	0	0	1786	1775
ELECTROCONDUCTIVE[W]POLYMER&	46	5	96	1775
CONDUCT&[W]POLYMER&	252	242	333	331
CONDUCT&[W]PLASTIC&	20	10	35	35
POLYMER&[W]CONDUCTOR&	4	0	5	5
ORGANIC CONDUCTOR ★	0	0	530	536
ORGANIC[W]CONDUCTOR&	42	34	64	547
POLYMERIC SEMICONDUCTOR ★	0	0	78	75
POLYMER&[W]SEMICONDUCTOR&	0	1	0	75
ORGANIC SEMICONDUCTOR ★	0	0	309	310
ORGANIC[W]SEMICONDUCTOR&	21	11	37	313
SUBTOTAL A	385	302	2341	2322
POLYMER[W]BATTER&	13	5	25	25
POLYMER&[W]BATTER&	13	5	25	25
POLYMER&[1W]BATTER&	16	5	31	31
PLASTIC[W]BATTER&	3	2	9	9
PLASTIC[1W]BATTER&	3	2	10	10
PAPER[W]BATTER&	0	1	4	3
PAPER[1W]BATTER&	1	1	8	7
ORGANIC[W]BATTER&	0	0	2	2
ORGANIC[1W]BATTER&	1	0	4	4
SUBTOTAL B	19	8	51	50
TOTAL (A+B)	402	309	2364	2345
LN=JA	316	256	1828	1810
% LN=JA	79%	83%	77%	77%

Figure 4. Search results when searching in English.

	JICST FILE 010	JQUICK FILE 030	NK-MEDIA FILE 070
TOTAL (A+B)	2815	304	146
LN=JA	2233	302	146
%LN=JA	79%	99%	100%
TOTAL NUMBER OF RECORDS	6,282,674*	2,844,663*	255,324
RECORDS BEGIN	1981	1990	1983
DATE SEARCH WAS CONDUCTED	2/21/93	2/22/93	2/22/93
DATE OF FILE UPDATE	2/13/93	2/11/93	2/18/93
ENGLISH TITLES	144/210	58/110	0%
ENGLISH ABSTRACTS	0%	14/110	0%
ENGLISH KEYWORDS	0%	0%	0%
JAPANESE ABSTRACTS	100%	37/110	100%
JAPANESE KEYWORDS	100%	0%	100%

Figure 5. Comparison of search results by file when searching in Japanese.

	JICST FILE 010	JQUICK FILE 030	JICST-E FILE 510	JICST-E STN
TOTAL (A+B)	402	309	2364	2345
LN=JA	316	256	1828	1810
% LN=JA	79%	83%	77%	77%
TOTAL NUMBER OF RECORDS	6,282,674*	2,844,663*	1,589,666	--
RECORDS BEGIN	1981	1990	1985	1985
DATE SEARCH WAS CONDUCTED	2/21/93	2/22/93	2/22/93	2/23/93
DATE OF FILE UPDATE	2/13/93	2/11/93	2/17/93	2/14/93
ENGLISH TITLES	21/21	85/85	100%	100%
ENGLISH ABSTRACTS	0%	30/85	97/194	--
ENGLISH KEYWORDS	0%	0%	100%	100%
JAPANESE ABSTRACTS	100%	5/85	0%	0%
JAPANESE KEYWORDS	100%	0%	0%	0%

Figure 6. Comparison of search results by file when searching in English.

in Japan. In order to fairly compare the results of these searches, some additional information about each file is necessary. Figures 5 and 6 provide some information about the various files and about the fields that are likely to be present in a citation drawn from each file. Although this is not stated in Figures 5 and 6, each Japanese file does, of course, provide a Japanese title for each citation. Where a number is given as a percentage, the percentage applies to the entire file, regardless of the search strategy or topic. Where numbers are presented as a ratio, the result shown is simply the result for the citations found in 1992 for the particular

	JICST FILE 010	JQUICK FILE 030	NK-MEDIA FILE 070
PD=1992	210	110	11
LN=JA	184	110	11
% LN=JA	88%	100%	100%
PD=1991	348	94	17
LN=JA	286	93	17
% LN=JA	82%	99%	100%
PD=1990	373	77	15
LN=JA	294	76	15
% LN=JA	79%	99%	100%
PD=1989	299	22	13
LN=JA	240	22	13
% LN=JA	80%	100%	100%
PD=1988	304	0	11
LN=JA	229	0	11
% LN=JA	75%	--	100%
PD=1987	289	1	21
LN=JA	207	1	21
% LN=JA	72%	100%	100%
PD=1986	284	--	11
LN=JA	206	--	11
% LN=JA	73%	--	100%
PD=1985	232	--	23
LN=JA	187	--	23
% LN=JA	81%	--	100%
PD=1985-date	2339	--	122
LN=JA	1833	--	122
%LN=JA	78%	--	100%

Figure 7. Comparison of search results by year when searching in Japanese.

	JICST FILE 010	JQUICK FILE 030	JICST-E FILE 510	JICST-E STN
PD=1992	21	85	194	178
LN=JA	20	77	168	153
% LN=JA	95%	91%	87%	86%
PD=1991	48	103	357	354
LN=JA	38	83	294	291
% LN=JA	79%	81%	82%	82%
PD=1990	55	91	372	372
LN=JA	44	72	293	293
% LN=JA	80%	79%	79%	79%
PD=1989	35	30	294	294
LN=JA	27	24	235	235
% LN=JA	77%	80%	80%	80%
PD=1988	61	0	298	298
LN=JA	54	0	222	222
% LN=JA	89%	--	74%	74%
PD=1987	57	0	284	284
LN=JA	45	0	200	200
% LN=JA	79%	--	70%	70%
PD=1986	51	--	272	272
LN=JA	41	--	190	190
% LN=JA	80%	--	70%	70%
PD=1985	56	--	230	230
LN=JA	42	--	181	181
% LN=JA	75%	--	79%	79%
PD=1985-date	384	--	2301	2282
LN=JA	311	--	1783	1765
% LN=JA	81%	--	77&	77%

Figure 8. Comparison of search results by year when searching in English.

search strategy employed in this example. Other searches on other topics may yield quite different results.

Because of the different years included in different files, a year-by-year comparison is instructive. Figures 7 and 8 display the total number of citations identified in each file for each year, beginning with 1992 and working back to 1985. The percentage of Japanese language records is also indicated for

CONDUCTING POLYMERS/POLYMER BATTERIES
JAPANESE - ENGLISH INTERSECTION
JICST; FILE 010
NA=JPN

Year	JICST FILE 010 Search in Japanese	JICST FILE 010 Search in English	Japanese search only	Japanese and English	English search only
1992	210	21	191	19	2

Coverage by searching in English = 19/210 = 9%

CONDUCTING POLYMERS/POLYMER BATTERIES
JAPANESE - ENGLISH INTERSECTION
JICST; FILE 010 vs. JICST-E; FILE 510
NA=JPN

Year	JICST FILE 010 Search in Japanese	JICST-E FILE 510 Search in English	Japanese search only	Japanese and English	English search only
1992	210	194	24	186	8

Coverage by searching in English = 186/210 = 89%

CONDUCTING POLYMERS/POLYMER BATTERIES
JAPANESE - ENGLISH INTERSECTION
JICST; FILE 010 vs. JICST-E; STN
NA=JPN

Year	JICST FILE 010 Search in Japanese	JICST-E STN Search in English	Japanese search only	Japanese and English	English search only
1992	210	178	37	173	5

Coverage by searching in English = 173/210 = 82%

Figure 9. Coverage of papers published in Japan when searching English language files vs coverage when searching the JICST file in Japanese.

CONDUCTING POLYMERS/POLYMER BATTERIES
JAPANESE - ENGLISH INTERSECTION
JICST; FILE 010
LN=JA

Year	JICST FILE 010 Search in Japanese	JICST FILE 010 Search in English	Japanese search only	Japanese and English	English search only
1992	184	20	165	19	1

Coverage by searching in English = 19/184 = 10%

CONDUCTING POLYMERS/POLYMER BATTERIES
JAPANESE - ENGLISH INTERSECTION
JICST; FILE 010 vs. JICST-E; FILE 510
LN=JA

Year	JICST FILE 010 Search in Japanese	JICST-E FILE 510 Search in English	Japanese search only	Japanese and English	English search only
1992	184	168	22	162	6

Coverage by searching in English = 162/184 = 88%

CONDUCTING POLYMERS/POLYMER BATTERIES
JAPANESE - ENGLISH INTERSECTION
JICST; FILE 010 vs. JICST-E; STN
LN=JA

Year	JICST FILE 010 Search in Japanese	JICST-E STN Search in English	Japanese search only	Japanese and English	English search only
1992	184	153	34	150	3

Coverage by searching in English = 150/184 = 82%

Figure 10. Coverage of Japanese language papers published in Japan when searching English language files vs coverage when searching the JICST file in Japanese.

each year. The total number of citations identified in each file from 1985 to date is also included. The nominal starting date of the JICST-E file is January 1985, so any comparison extending earlier than 1985 has no real meaning.

The intersection between selected pairs of searches is displayed in Figures 9 (NA = JPN) and 10 (LN = JA). In each case, the total number of citations identified by a search in Japanese is compared with the total number of citations identified by a search in English. These citations are then classified according to whether the citation was included only in the Japanese language search, only in the English language search, or in both the Japanese and English language searches. The percentage shown for each comparison indicates the degree to which the English search identified the documents that would have been identified had the search been carried out in Japanese using the JICST file as a reference.

5. ANALYSIS

The key issues to be addressed are selecting the correct search terms, constructing a complete search strategy, and deciding which file(s) to search in which language. For both the English and Japanese searches the vast majority of the citations were identified using the keywords contained in the controlled vocabulary (Figures 3 and 4). It is important to note that in the JICST-E file each controlled term consisting of two or more words must be entered as a unit rather than as the intersection of two or more individual words. The use of truncation symbols during the search similarly causes the computer to overlook citations for which the only hit that might otherwise occur results from the appearance of the term in the keyword field. Thus, in this example "electroconductive polymer" yielded 1786 citations, but "electroconductive[W]-polymer&" yielded only 96 citations. "Polymeric semiconductor" produced 78 citations, but "polymer&[W]semiconductor&" failed to produce a single citation (Figure 4).

The number of terms required in Japanese to adequately express a fixed number of English terms varies tremendously depending upon the topic. The widespread use of *katakana* (phonetic elements that are used to express many foreign words in Japanese) in certain technical fields means that some English terms could be expressed in a *kanji* (ideographic characters originally borrowed from China) representation and in a *katakana* representation. In other situations one Japanese term may correspond to several English terms. Thus, it is necessary to include in both lists of search terms the terms preferred by specialists in the field, as well as literal translations of terms from the other language and the translations recognized in the *JICST Thesaurus*. Failure to do so could seriously limit the number of citations produced and reduce the value of the entire search exercise.

In this specific example the bulk of the citations identified in the total search came from part A, regardless of the file or language used. Of the 2756 citations identified in part A when searching the JICST file in Japanese, 79% were Japanese language records. Of the 118 citations identified in part B of the same search, 94% were Japanese language records (Figure 3). This is consistent with the general tendency to encounter a higher percentage of English language records when dealing with more fundamental or basic topics and a higher percentage of Japanese language records when dealing with applications of a technology to a specific product. Part A included citations from a wide variety of sources: technical journals, conference preprints, government or technical society reports and some trade journals. Part B included mostly citations from trade journals, which are quite naturally written in Japanese. All of the citations contained in the NK-MEDIA

file are Japanese language citations, since the *Nikkan Kogyo Shimbun* is a Japanese language newspaper.

Almost all of the citations identified when searching the JQUICK file in Japanese were Japanese language citations (99%), although the percentage of Japanese language records found when searching the JQUICK file in English (83%) or when searching the JICST-E file (77%) were close to the percentage for the Japanese language search of the JICST file (79%). It should be noted that the value of the JQUICK file lies in the brief lag time between appearance of the original document in print and the inclusion of the citation in this file. In fact, of the 110 citations identified for 1992 by the Japanese language search in JQUICK, 43 citations were newer than the most recent citation identified by the Japanese language search in the JICST file. Similarly, of the 85 citations identified for the same year by the English language search in JQUICK, 38 were more recent citations than the most recent citation produced by the English language search in the JICST-E file. The drawback associated with this major shortening of this delay comes from the fact that this file contains no keywords, and the percentage of records containing abstracts or an English title varies tremendously according to the search topic and the search language used. In the present example, of the citations produced when searching the JQUICK file in English all of the records included English titles, less than 10% contained Japanese abstracts, and more than a third contained English abstracts. Thus, if a citation did not contain an English title, it is unlikely that a search of the JQUICK file in English would have produced that citation. In contrast, of the citations identified when searching the JQUICK file in Japanese only about half included English titles, roughly one-third contained Japanese abstracts, and about 10% included English abstracts. The inherent variability of citations in this file makes clear the danger associated with making assumptions about the characteristics of the Japanese language citations based only upon a search in English. The completeness of the citations and the high level of quality control associated with the JICST file make this file the standard against which to measure all of the other files available through JOIS.

The number of records produced by the search of the JICST-E file reached 84% of the total number of records produced by searching the JICST file in Japanese (2364 vs 2815). If the range of the search is restricted to cover 1985 to the present, this percentage rises to 98% (2301 vs 2339). The degree of coverage of the JICST file by the JICST-E file thus appears to be extremely high. The actual overlap between these two searches will be discussed in more detail later. All of the other searches produced far fewer citations. The real value of the NK-MEDIA file and the JQUICK file, however, is not their size but results from the ability to access citations with a lag time that is shorter than that associated with the JICST file.

In Figures 7 and 8 the numbers of citations produced year by year in several of the JICST files are listed. Taking the Japanese search of the JICST file as a standard, it is clear that there is almost no value in searching the JICST file in English. Of course, that is not the purpose of that file. The JICST-E file was designed specifically for searching in English, and an English language search of the JICST-E file consistently produced year by year the same number of citations (plus or minus 5%) as a Japanese language search of the JICST file. The degree of overlap between the Japanese language search of the JICST file and the English language search of the JICST-E file for 1992 is shown quantitatively in Figures 9 and 10. The use of the same citation numbers in the JICST file and the JICST-E file makes analysis of this overlap quite simple to carry out. The existence of some citations that were identified in only the Japanese language search or in only the English language search meant that 89% of the citations identified for 1992 were in fact common to both sets (Figure 9). The 24 citations that appeared only when searching in Japanese were produced because search terms appeared in the abstracts of these citations. Figure 6 indicates that only about half of the records produced from the JICST-E file contained abstracts. Raising the percentage of citations in JICST-E that included abstracts would certainly reduce the number of citations that appeared only in the Japanese language search of the JICST file. The eight citations that were identified only by the English language search were picked up because search terms appeared in the English abstract, but not in the Japanese abstract. This percentage is quite small, however. A comparison of Figure 9 with Figure 10 suggests that whether the original document was written in English or in Japanese, there is no significant effect on the percent coverage in the comparison searches.

6. SEARCHING JICST-E ON STN

A further comparison that would also be of interest to many potential users of the JICST database is the comparison between a search of JICST-E direct from JOIS and a search of JICST-E as it is distributed by STN. STN (Scientific and Technical Information Network) is operated jointly by JICST, the Chemical Abstracts Service, and FIZ Karlsruhe. Among the many files available from STN is a derivative of the original JICST-E file compiled by JICST. The JICST-E file available through STN contains for each citation the same information included in the JICST-E file available through JOIS, with the addition of one new field: broad terms (BT). The terms in the BT field of JICST-E on STN are taken from the *JICST Thesaurus*. The use of broad terms in the search list allows the user to retrieve records that contain all of the narrow terms that are grouped together under that broad term. For example, the use of "solid electrolyte" in the search list employed on STN would produce all of the records that contained as a keyword "superionic conductor", in addition to all of the records that contained "solid electrolyte", because "superionic conductor" is a narrow term that is included under "solid electrolyte" according to the *JICST Thesaurus*. This BT field appears only in the version of JICST-E distributed by STN. In the example presented in this paper the presence of the BT field had no impact on the number of citations produced, since the only search terms that qualified as broad terms were "polymeric conductor" and "organic conductor". The only narrow terms that fall within the scope of these broad terms are "polymeric semiconductor" and "organic semiconductor", respectively, but both of these terms were already included in the initial search strategy. In some searches the effect of the presence of the BT field in the JICST-E file available through STN would be to increase the number of citations identified using the same search for JICST-E on STN to a number higher than that produced by the same search for JICST-E on JOIS.

In this specific example the results obtained when searching JICST-E through STN have been included in each figure along with the results obtained when searching JICST-E through JOIS. Over time the number of citations obtained via STN match almost exactly the number of citations obtained via JOIS (Figure 8). However, a difference did appear for 1992. For 1992 there were 16 citations that were identified

by both the Japanese language search of the JICST file and the English language search of the JICST-E file on JOIS that were not identified by the English language search of JICST-E on STN. When the specific citation numbers for these 16 citations were called up on STN, the system responded that these records did not exist in this database. Thus, there is some period of delay between the time a citation appears in JICST-E through JOIS and the time that the same citation appears in JICST-E through STN. In this particular example the difference between the results obtained using these two versions of JICST-E amounted to 6% of the total number of citations identified in the Japanese language search of the JICST file (Figure 9). With the passage of time it is clear that this difference disappears.

7. SUMMARY

It is possible to access the JOIS database service from the United States using hardware and software that are readily available in the United States. In general a search of the JICST file (file 010) in Japanese is the best way to obtain the most complete coverage of those citations produced in Japan that are included in the JICST database. Other files may also be searched, depending upon the specific topic and the type of publication that the user desires to cover. (The JICST database does not include patents.) A well-constructed search of the JICST-E file (file 510) in English may retrieve as many as 90% or more of the citations identified by the Japanese language search in the JICST file. This figure will vary significantly, depending upon the specific topic and the success in constructing an English language search that is truly equivalent to the Japanese language search. An English language search of the JICST-E file available through STN may retrieve as many as 90% of the citations identified by the same English language search of the JICST-E file through JOIS. Other files, such as the JQUICK file and the NK-MEDIA file, complement the JICST file by providing more rapid access to citations that will eventually become part of the JICST file or by searching a different body of information coming from one of Japan's major industrial newspapers.

Caution is necessary when comparing searches carried out in different languages through different files. Rigorous use of the *JICST Thesaurus* will minimize the likelihood of overlooking potentially valuable citations, regardless of the file or search language employed.

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