

## A TRAVEL AMONG THE GHOSTS

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The dynamic distribution of authors dealing with the same subject is studied. The method provides an important facility to obtain a new scope of the research and technology activities of one area.

### Introduction

Information distributions obey to various laws [1-3] which are characterized by a large number of items (e.g. authors, codes, key-words...) appearing in a set of references with a very low frequency.

In this paper we want to study the dynamic distribution of authors dealing with the same subject. To achieve it we will focuss on the core of authors which remains constant between various periods of time. For instance for a given subject an interval of time will be divided in 2; 3, 4 periods of time according the total number of years of the interval.

The periods chosen will have approximately three years, since most of the researchers publish at least one paper in this interval of time.

### Material and methods

On line systems such as Orbit Search Service that we are going to use for this work [4] allow to access various databases and to perform on the authors field (among other fields) a GET command. The output of this command is to obtain a list of the authors ranked by decreasing frequency order [5]. These files will be save on a micro-computer and used offline as a starting material for comparison. The DATAGET software developed in our laboratory allows to obtain common or different terms between these files [6,7].

The subjects which have been chosen are not specific of a type of response. From our experience, the two examples which are given are fairly general.

### Microwave propagation

The references dealing with this concept have been retrieved by the following research equation: (micro(W)wave# or microwave#) (L) propagation; # is a mask, (W) is a proximity operator (L) links the terms in the same member of a sentence.

The database used is INSPEC which deals with fundamental aspects of physics.

The interval 1977 to 1991 has been divided in 4 periods:

Table 1  
Number of authors and index terms per periods

Periods	References	Authors	Index terms
77-80 A	191	347	846
81-84 B	268	467	371
85-87 C	196	398	291
88-91 D	337	756	520

There are 424 new authors in period B, compared to period A. The fate of this flux (the 424 authors) is now analyzed according the authors which will remain present in period C and in period D. 42 authors from the 424 are still present in period C, and only 11 in period D. This means that the flux of specialists of the theme (described by the query) is rather small. The same treatment can be made using the new authors in period C compared to period B: there are 328 new authors and among them only 47 are still present in period D. The last comparison is made between periods C and D: there are 326 new authors in period D compared to period C. These comparisons are interesting since they emphasize the small amount of new specialists in this area.

Another comparison can be made: we determine in this case the authors common to periods:

Table 2  
Various comparisons performed between various periods of time

Periods	Common authors
A, B, C, D	7
A, B, C	8
B, C, D	15
A, B	43
B, C	35
C, D	65

These analyses pointed out that if you are looking for information for action, that is to say information concerning the main teams and people, the core of specialists is very small. This consideration must be kept in mind when citation indexes are used in the same area, or when maps of works related by citations are drawn [8]. In this cases, it will be good to have also the graph of authors present in the field during various periods of time. The other citations will have then a more considerable meaning since they will be really related to the very starting ideas of the research in the theme.

Most people consider only the bulk of authors and the frequency of their work during the whole period of time. Dynamic analysis can provide interesting informations. Particularly, it pointed out that only few people remain in one field during a period close to 10 years. This is important because it means that the specialists will not necessarily steady authors but can be newcomers to this field according the incentive and opportunities.

### Actuator

This quite new field has been analyzed using the citation index database (SCI). The term ACTUATOR# has been used for the query.

The results are as follows:

Table 3  
Actuator, number of authors for different periods of time

period	References	Authors
81-83	0	0
84-87	111	203
88-90	276	546

The authors have been ranked by decreasing frequency for the two last periods, and the common authors for both periods were determined.

Of a total of 725 authors, there are only 24 common authors in these two periods. Again, this emphasize the fact that when authors are considered in a subject, their dynamic appearance is very important to have a credible scope of the field.

Tables 4, 5, 6 and 7 show various output of the software used to compare the lists of authors.





Table 7  
Common authors in the files 84-87 and 88-90 (*SciSearch*; ACTUATOR#)

8	UCHINO K	1	KURIBAYASHI K
7	UCHINO K	1	KURIBAYASHI K
5	TAKAHASHI S	1	KUROSAWA M
1	TAKAHASHI E	1	KUROSAWA M
2	ASAKURA H	1	LANG JH
1	ASAKURA H	1	LANG JH
2	BERGVELD P	1	SATO T
6	BERGVELD P	1	SATO T
2	HAFTKA RT	1	SCOTT AB
1	HAFTKA RT	1	SGOTT AB
2	SAKAI N	1	SMIRNOVA EP
1	SAKAI N	1	SMIRNOVA EP
2	YAMAMURA H	1	SOTNIKOV AV
1	YAMAMURA M	1	SOTNIKOV AV
1	CROSS LE	1	UEHA S
5	CROSS LE	1	UEHA S
1	ELJAI A	1	VANDERSCHOOT B
1	ELJAI A	3	VANDERSCHOOT BH
1	HASHIMOTO M	1	YAMADA H
1	HASHIMOTO A	1	YAMADA H
1	HIROSE T	1	YAMASAWA K
2	HIROSE T	2	YAMASAWA K
1	JOHNSON M	1	YUSHIN NK
1	JOHNSON M	1	YUSHIN NK

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