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COMPUTER BIBLIOMETRICS FOR JOURNAL CLASSIFICATION*

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Abstract – Data on article distributions over journal titles and subject subdivisions of a selected field could be extracted (on- or offline) from every bibliographic file including a classification scheme. On the basis of such data, journals could be subdivided into specialized, average, or general using an appropriate measure of dispersion (or concentration). To this end, Pratt's absolute measure of dispersion $q = \sum r * F_r$ is suggested, where the F_r represent the relative frequencies (in descending order) of articles from a given journal in the unidentified subject subdivisions with rank $r = 1, 2, \ldots, n$. In order to separate specialized and general journals from average ones, it is assumed that each empirical q-value has a 'random' deviation d. A w-statistic is introduced to test whether the q-values differ significantly from the average q_{av} on a specified confidence level, where $w = (q - q_{av})/d$. In addition, a subject relative measure of dispersion Q is used to determine which subdivisions are favored by which journals. Another W-statistic is proposed to test whether the Q-values differ significantly from Q_s (absolute measure of dispersion of the subject distribution). This bibliometric technique is applied to data from the 1984 INSPEC file. The results could help library staff and information scientists in classifying journals according to the two measures of article dispersion over subject subdivisions.

INTRODUCTION

Strengths and shortcomings of quantitative criteria for journal selection and ranking (such as productivity, citation rate, and frequency of use) are largely discussed by Singleton [1], Dhawan *et al.* [2], and others. Journal productivity in selected fields (as reflected, for example, by the number of articles abstracted by a relevant database) has been analyzed more or less in relation to the Bradford distribution. Number of citations exchanged between journals is more meaningful in "international" fields of science. Frequency of library use is in principle confined to a small sample of journals. Furthermore, none of the indicated analyses deals with more detailed questions such as:

- How are journal articles scattered over the field subdivisions, i.e., do the journals under consideration cover all subdivisions uniformly or are their articles concentrated in one or several smaller subfields?
- Which journals contribute to the coverage of the selected field, and in what ways?

The purpose of this paper is to answer these questions by using a measure of article dispersion (over unidentified and identified field subdivisions), as defined by Pratt [3], as well as by suggesting an indicator of significance for classifying a set of relevant journals according to the range and specificity of their subject scope.

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METHOD

Persson [4], Bauin and Michelet [5], Persson [6], and Todorov [7] use on- and offline techniques to collect various data from traditional bibliographic files for bibliometric or scientometric purposes. Such studies are influenced by the record entries available and the subject areas covered. A large number of discipline oriented databases include more or less elaborated classification schemes to index (order) scientific documents. Every item is assigned to one or several subdivisions (or subject headings). By using an appropriate software, it is possible to gather data on article distributions over journal titles (*JT*s) and subject headings (*SH*s), and arrange them in a rectangular table with *JT*s as rows and *SH*s as columns. An element of such a journal-by-heading matrix expresses the number of articles of a *JT* classified in a given *SH*. (In this case each paper is assigned to one and only one heading.) The row sums (journal sizes) are traditionally used to demonstrate the Bradford distribution. Column sums represent the partition of all articles over the *SH*s. This subject distribution characterizes the selected field as a whole.

For the specific purpose of the study, namely to determine the partition characteristics of a large number of journals, several measures could be used; see for example [8]. Because we are concerned here with a rank-frequency distribution, Pratt's absolute measure of dispersion q is selected [3]

$$q = \sum r * F_r,$$

with F_r representing the relative frequencies (in descending order) of articles from a given *JT* in the unidentified *SH*s with rank $r = 1, 2, \ldots, n$. In other words, F_r is greater than (or equal to) F_{r+1} for all r. A q value of 1 is the extreme case for total concentration ($F_r = 1$, $r = 1$) while $q = (n + 1)/2$ is the limit for the even or uniform partition case ($F_r = 1/n$ for all r).

To separate specialized and general journals from average ones it is assumed, as in [9], that each empirical q-value has a random deviation d. (The Pratt's measure q is interpreted as an empirical mean of the distribution of articles over the ranked *SH*s.) But the variation of the mean of any empirical distribution is equal to the variation of the theoretical distribution divided by the sample size, and the theoretical value of the variation could be estimated by the corrected empirical variation. Hence the approximation $d^2 = \left(\sum r^2 * F_r - q^2\right)/N$ could be used as shown by Kendall [10]. (Sample size N represents here the number of papers from the journal, i.e. the corresponding row sum of *JT*.) Then, a w-statistic is introduced to test whether the q-values differ significantly from the average value (q_{av}) on a specified confidence level, where $w = (q - q_{av})/d$. According to this same criterion, journals covering a single subfield could be determined as well. In this case, $w^* = (q - q_{min})/d = (q - 1)/d$.

Another measure Q (Pratt's relative measure of dispersion) is then used to classify the journals according to their resemblance to the subject distribution, i.e., to determine how distributions differ from the subject partition when the field subdivisions are identified:

$$Q = \sum r * S_r,$$

with S_r representing the proportions of articles from a given *JT* in the *SH*s with rank $r = 1, 2, \ldots, n$ established by the subject distribution [3]. In other words, the descending order of the column sums determines the rank. The value of Q can range from 1 to n according to the concentration of articles, correspondingly in the largest and smallest subject subdivisions.

In order to establish whether the Q-values differ significantly from the absolute measure of dispersion Q_s (of the subject distribution), the following formula could be used:

$$W = \frac{Q - Q_s}{\sqrt{D^2 + D_s^2}}$$

with $D^2 = \left(\sum r^2 * S_r - Q^2\right)/N$ and D_s = deviation of Q_s. This equation is based on the so-called Welch test in whose place a normality test could be applied, provided the number N is sufficiently large. Thus, the criteria for the test statistic W are the same as those in the first case for w.

Finally, the *JT*s could be represented as points in a two dimensional space with axes q and Q, and subdivided into specialized or general (according to q-value), and into such favoring less or heavily used subject subdivisions (according to Q-value).

APPLICATION IN THE FIELD OF PHYSICS

Data and analysis

This bibliometric method for journal classification is applied in the field of condensed matter physics (CMP). Data for CMP journals and their article distributions over the CMP subdivisions are extracted from the 1984 INSPEC file (printed version: Physics Abstracts). Classification codes are assigned to the documents of this file together with traditional bibliographic data. For the purpose of the study, all article records with first (main) classification code from CMP and the corresponding *JT*s have been recorded on a separate tape. An appropriate software has been developed for tabulating the *JT*s as rows and the 17 CMP subject headings (*SH*s) as columns. These 17 *SH*s correspond to the second level headings of the International Classification for Physics and are given in Table 1. The journal-by-heading matrix is shown in Table 2. For reasons of statistical validity the initial set of all journals is reduced to 95 *JT*s by discarding low productive journals, i.e., those which are represented by fewer than 48 articles in the CMP section of the 1984 Physics Abstracts. (This threshold value for one year corresponds to a journal publishing at least 4 CMP articles monthly.) For the 95 selected *JT*s the values for q, d, w, and Q, D, W have then been calculated.

Results

In Table 2 the selected 95 journals are arranged according to their productivity in the field of CMP (column Sum). In the Ratio column of the same table is shown the proportion of CMP articles from the total number of papers contained in Physics Abstracts (cross-disciplinary physics and geophysics excluded). Journals with a high proportion of CMP articles could be subdivided into pure CMP journals (e.g. 1, 2, 3, 4, 5, 7, 8, etc.), crystallog-

Table 1. Subject subdivisions for condensed matter physics (CMP)

Code	CMP subdivision
61	Structure of liquids and solids; Crystallography
62	Mechanical and acoustic properties of condensed matter
63	Lattice dynamics and crystal statistics
64	Equations of state, phase equilibria, and phase transitions
65	Thermal properties of condensed matter
66	Transport properties of condensed matter (nonelectronic)
67	Quantum fluids and solids; liquid and solid helium
68	Surfaces and interfaces; Thin films and whiskers
71	Electron states
72	Electronic transport in condensed matter
73	Electronic structure and electronic properties of surfaces; Interfaces and thin films
74	Superconductivity
75	Magnetic properties and materials
76	Magnetic resonances and relaxation in condensed matter; Moessbauer effect
77	Dielectric properties and materials
78	Optical properties and condensed matter spectroscopy and other interactions of matter with particles and radiation
79	Electron and ion emission by liquids and solids; Impact phenomena

raphy (e.g. 22, 29, 30, 46, 58, 60, 67), material science (24, 36, 37, 78, 80), polymer science (47, 51, 83), and chemistry journals (17, 21, 32, 55, 79, 84, etc.). There is a strong group of general physics journals publishing a large number of CMP articles (e.g. 9, 12, 14, 16, 20, 23, 26, 45, etc.).

On the basis of q- and Q-values, the 95 CMP journals are represented in a two dimensional space with axes q and Q. According to the w-values (on 95% confidence level) the CMP journals are classified into the following groups: specialized (see Fig. 1), average (see Fig. 2), and general (see Fig. 3). According to the W-values (on 95% confidence level), 50 journals have Q-values which are not significantly different from the Q_s: they are represented by filled points on Figs. 1-3. The remaining 45 journals have article distributions which differ significantly from the subject partition: 17 favor the smaller CMP subdivisions (the hollow points in the upper parts of Figs. 1-3) and 28 publish exclusively in the largest CMP subdivisions (the hollow points in the lower parts of Figs. 1-3).

Table 2. Journal-by-heading table for CMP

	CMP subject subdivisions (Names are given in Table 1)																			
Journal[†]	61	78	71	72	75	68	73	76	64	74	66	79	77	62	63	67	65	SUM	Phys. Abs.	Ratio
1 PHYS REV B	96	193	350	133	248	128	102	75	68	120	24	72	32	15	64	60	13	1793	1931	0.93
2 SOL ST COMM	57	169	169	105	95	39	49	69	23	35	14	41	11	9	20	3	11	919	932	0.99
3 PHYS ST S-B	70	136	135	72	86	5	17	52	17	17	13	13	17	12	44	1	6	713	728	0.98
4 FIZ TVERD T	64	98	87	64	97	16	18	66	25	19	20	13	36	38	22	1	9	693	705	0.98
5 J PHYS C	50	81	134	60	109	19	25	48	27	6	16	10	16	4	21	7	5	638	667	0.96
6 J APPL PHYS	101	70	39	80	43	61	94	4	20	30	34	12	21	22	2	1	2	636	903	0.70
7 PHYS ST S-A	131	92	14	96	42	25	38	17	35	4	20	15	18	22	1	0	13	583	596	0.98
8 SOV PH SE R	47	78	71	189	5	1	104	9	2	2	5	2	2	0	2	0	0	519	532	0.98
9 PHYS REV L	45	36	52	35	39	62	35	9	39	18	13	26	7	4	13	46	5	484	1133	0.43
10 SURF SCI	12	22	3	3	1	281	22	1	1	0	0	100	1	0	2	0	0	449	458	0.98
11 J CHEM PHYS	97	90	27	8	6	42	4	57	52	0	0	16	10	10	7	1	13	440	1354	0.32
12 J PHYS JPN	28	47	43	29	77	4	8	43	20	19	3	6	29	13	8	4	8	389	551	0.71
13 APPL PHYS L	71	46	17	32	6	43	73	4	5	18	30	6	5	2	0	0	0	358	603	0.59
14 PHYS LETT A	55	29	41	19	66	6	5	29	18	31	5	3	3	8	7	16	3	344	822	0.42
15 J PHYS F	51	14	45	48	49	5	5	17	6	18	3	6	0	5	6	0	4	282	284	0.99
16 UKR FIZ ZH*	40	68	28	41	16	6	12	9	4	0	7	4	5	4	3	2	3	252	373	0.68
17 IVUZ NEOR M*	69	21	8	34	11	17	7	8	34	1	15	2	11	5	1	0	6	250	258	0.97
18 CHEM PHYS L	31	65	10	8	4	23	2	44	19	0	7	15	6	1	13	0	1	249	910	0.27
19 FIZ METAL M	54	6	11	18	69	2	2	9	33	7	9	0	0	17	4	0	7	248	252	0.98
20 ZH EKSP TEO	15	15	30	24	49	4	5	17	1	17	2	1	0	7	5	13	0	205	313	0.65
21 J SOL ST CH	110	17	1	7	13	0	0	5	16	0	13	2	4	0	0	0	3	191	191	1.00
22 KRISTALLOGR	126	18	0	3	3	7	0	2	11	0	1	1	11	7	1	0	0	191	203	0.94
23 JETP LETTER	7	22	31	34	21	6	17	13	8	5	3	2	4	2	2	11	3	191	351	0.54
24 J MATER SCI	56	18	0	12	9	11	14	7	7	4	15	6	7	23	0	0	2	191	199	0.96
25 THIN SOL FI	17	24	3	14	4	60	40	1	2	3	13	5	2	2	0	0	0	190	196	0.97
26 ACTA PH SYN*	40	21	15	5	8	8	6	6	16	24	7	1	3	4	4	4	1	173	276	0.63
27 JPN J A P 1	31	24	8	22	9	15	13	5	4	9	6	11	10	5	0	0	0	172	270	0.64
28 FIZ NIZ TEM	2	5	17	10	23	2	4	9	5	51	2	0	0	1	3	26	5	165	168	0.98
29 MOLEC CRYST	89	14	2	4	0	2	0	2	39	0	1	0	4	2	2	0	2	163	170	0.96
30 CRYST RES T	82	28	0	3	1	9	6	1	8	0	5	0	2	14	2	0	2	163	165	0.99
31 ZH TEKH FIZ	36	23	0	15	14	8	9	7	4	3	2	18	8	4	0	0	0	151	465	0.32
32 J ELEC CHEM	26	20	3	12	0	19	39	0	10	0	12	1	1	0	0	0	3	146	159	0.92
33 Z PHYS B	15	6	26	11	28	5	2	8	15	7	0	5	0	1	8	6	1	144	219	0.66
34 JTP LETTER*	18	24	4	16	16	14	18	1	3	4	2	8	6	4	0	0	0	138	319	0.43
35 MOLEC PHYS	68	9	3	1	1	8	0	21	7	0	5	0	8	1	2	0	0	134	265	0.51
36 J M M MATER	3	2	6	6	97	1	0	16	1	0	0	0	0	0	0	0	0	132	135	0.98
37 MATER RES B	65	7	3	6	8	5	3	9	10	1	7	0	2	2	1	0	0	129	133	0.97
38 JPN J A P 2	31	15	9	10	9	17	16	3	1	8	0	5	3	0	0	0	0	127	200	0.64
39 J LESSC MET	57	1	3	4	11	11	1	5	21	0	5	0	0	1	1	0	3	124	124	1.00
40 J NON-CRYST	45	20	1	13	0	1	4	7	8	0	8	4	0	5	0	0	4	120	122	0.98
41 J L TEMP PH	0	0	5	7	2	1	2	1	0	60	0	0	0	2	2	36	1	119	126	0.94
42 J PHYS CHEM	15	32	3	3	2	20	2	15	4	0	8	1	4	2	0	0	2	113	349	0.32
43 J PHYS D	8	10	2	16	7	3	24	5	2	3	8	9	11	5	0	0	0	113	215	0.53
44 PHYS REV A	44	10	2	2	2	3	0	2	24	3	5	5	3	3	0	4	0	112	884	0.13
45 J PHYSIQUE	31	6	7	6	12	3	4	7	15	2	3	1	2	5	1	3	0	108	155	0.70
46 ACT CRYST C	106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	106	106	1.00
47 J POL SC PP	55	9	1	1	0	4	0	5	10	0	9	0	6	2	1	0	3	106	117	0.91

[†]Science Citation Index (SCI) abbreviations are used for journals titles
*Journals not included in the SCI

Table 2 continued.

Journal†	CMP subject subdivisions 61	78	71	72	75	68	73	76	64	74	66	79	77	62	63	67	65	SUM	Phys. Abs.	Ratio
48 PHIL MAG A	50	3	1	0	0	11	1	0	12	1	13	1	2	9	0	0	1	105	108	0.97
49 PHIL MAG B	10	17	13	36	3	3	4	2	2	0	0	2	0	3	3	0	1	99	102	0.97
50 J CRYST GR	59	0	0	2	0	24	1	0	12	0	0	0	0	0	0	0	0	98	100	0.98
51 POLYMER	39	10	0	2	0	0	0	10	12	0	7	0	6	4	1	0	3	94	102	0.92
52 I J PA PHYS	13	18	3	8	1	1	7	11	3	2	1	0	10	8	4	1	2	93	179	0.52
53 J PHYS LETT	23	6	2	11	13	8	2	4	6	2	4	1	4	2	1	3	0	92	143	0.64
54 SOL ST ION	13	4	0	6	0	0	0	1	1	0	56	0	3	0	3	0	3	90	91	0.99
55 J PHYS CH S	11	14	13	10	3	1	0	12	5	1	7	0	4	1	2	0	3	87	89	0.98
56 DAN SSSR	42	10	6	4	3	2	3	0	4	3	1	4	1	1	0	0	2	86	304	0.28
57 IVUZ FIZ	14	2	13	13	5	9	10	2	7	1	1	0	3	4	0	0	1	85	191	0.45
58 ACT CRYST A	80	1	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	84	88	0.95
59 OPT SPEKTRO	6	66	3	0	0	2	0	3	0	0	0	0	0	0	3	0	0	83	401	0.21
60 ACT CRYST B	77	0	1	0	0	1	0	0	0	0	0	0	1	0	2	0	0	82	85	0.96
61 APPL PHYS A	15	9	9	11	2	10	4	0	0	1	7	11	2	0	0	0	1	82	88	0.93
62 RADIAT EFF	50	6	0	2	0	0	1	1	3	0	1	14	0	2	0	0	0	80	86	0.93
63 CHEM PHYS	13	25	12	4	0	1	0	8	1	0	2	6	3	1	3	0	0	79	303	0.26
64 J. NUCL MAT	43	2	0	2	0	2	0	1	5	0	11	0	0	8	0	0	3	77	136	0.57
65 Z NATURFO A	26	12	3	1	3	3	0	12	6	0	5	0	1	0	2	0	2	76	166	0.46
66 J MAGN RES	0	0	1	0	1	0	0	73	0	0	0	0	0	0	0	0	0	75	235	0.32
67 Z KRISTALL	67	3	0	0	1	0	0	0	2	0	0	0	0	1	0	0	0	74	74	1.00
68 ACT METALL	35	0	0	0	0	5	0	0	13	0	7	0	0	14	0	0	0	74	76	0.97
69 CZEC J PHYS	3	15	14	9	2	6	3	7	2	4	0	0	1	3	0	0	1	70	124	0.56
70 PHYSICA B&C	10	4	9	5	12	0	2	6	6	2	3	0	1	1	4	5	0	70	112	0.63
71 VYSO SOED A	29	6	0	1	0	4	0	2	10	0	5	1	0	6	0	0	5	69	92	0.75
72 SCRIP METAL	36	1	0	1	0	4	0	0	5	0	10	0	0	11	0	0	0	68	69	0.99
73 FERROELEC L	1	10	2	5	0	0	2	0	3	0	1	0	40	4	0	0	0	68	70	0.97
74 LIT FIZIKA*	6	21	10	3	7	3	5	2	0	0	0	1	5	1	2	0	1	67	87	0.77
75 S ST PH JPN*	9	1	8	4	2	5	22	0	1	1	1	3	5	1	0	4	0	67	67	1.00
76 J AM CERAM	23	5	0	7	1	3	0	1	9	0	0	0	8	5	0	0	5	67	113	0.59
77 SYNTH METAL	8	4	8	23	3	0	0	5	3	3	0	0	1	0	2	0	2	62	62	1.00
78 J MAT SCI L	7	10	1	8	4	2	12	4	1	1	0	0	5	4	0	0	2	61	62	0.98
79 J CHEM THER	0	0	0	0	2	0	0	0	23	0	0	0	0	12	0	0	22	59	66	0.89
80 MATER LETT	18	5	1	2	2	10	4	1	6	2	4	0	1	1	0	0	1	58	61	0.95
81 J APPL CRYS	52	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	2	57	64	0.89
82 ZH PR SPEKT*	6	42	2	2	0	1	0	0	0	0	0	0	0	0	4	0	0	57	170	0.34
83 VYSO SOED B	26	6	0	1	1	3	0	3	8	0	4	0	5	0	0	0	0	57	60	0.95
84 F KH STEKLA*	19	13	1	4	0	0	0	2	7	0	6	0	1	1	0	0	3	57	61	0.93
85 ACT PHY P A	1	14	2	4	8	2	5	7	1	2	0	0	4	2	2	2	1	57	104	0.55
86 SOL ST ELEC	3	0	4	11	0	0	35	0	0	0	1	0	1	0	0	0	0	57	57	1.00
87 CR AC S II	21	1	1	3	3	12	1	3	7	0	2	0	1	0	0	0	0	55	120	0.46
88 CHIN J SEMI*	12	6	10	4	0	6	6	1	1	0	0	4	0	0	3	0	0	53	57	0.93
89 J CHEM S FI	8	5	0	0	0	17	0	2	9	0	5	1	3	1	0	0	2	53	70	0.76
90 SPECT ACT A	2	46	1	0	0	0	0	2	0	0	0	0	0	0	1	0	0	52	130	0.40
91 LIT FIZ SB*	5	11	0	19	4	3	2	1	0	0	0	1	4	0	1	0	0	51	88	0.58
92 NUOV CIM D	13	10	7	4	2	0	1	1	1	3	1	1	0	3	2	1	1	51	74	0.69
93 VOPR N T*	36	2	3	0	0	4	0	0	1	1	0	0	0	2	1	0	0	50	55	0.91
94 J RAMAN SP	1	43	1	0	0	0	0	0	3	0	0	0	0	0	1	0	0	49	75	0.65
95 CAN J PHYS	6	12	4	2	7	2	0	6	0	2	1	0	0	1	2	3	1	49	147	0.33

†Science Citation Index (SCI) abbreviations are used for journals titles
*Journals not included in the SCI

DISCUSSION

The idea underlying the analysis is that measures of article distributions over journal titles and subject headings could be used to characterize the scope (of a large number) of journals relevant to a given field. The additionally introduced measures of significance are applied to classify the journals into groups according to the selected measures of dispersion. Some (bibliometric) measures appear well suited to determine the scope of journals and in this way to answer the questions with which library staff and information scientists are concerned. Here Pratt's absolute and relative measures of dispersion are used to characterize article partitions of a journal over unidentified and identified subject headings. A w-statistic is introduced to subdivide journals into groups on a 95% confidence level (the threshold value then being 1.96). This means that the q-values have been compared to a selected cut-off point which is the average of the measures of dispersion q_{av}. It is evident that a subject independent cut-off point could also be selected: as an appropriate one appears the dispersion of the random (Whitworth) distribution q_{Whit} which depends only on

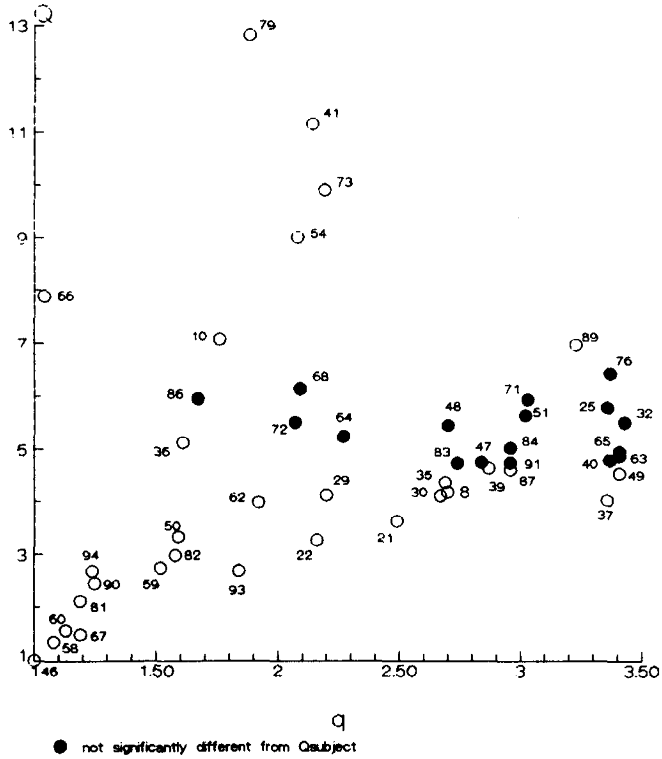

Fig. 1. Specialized CMP journals.

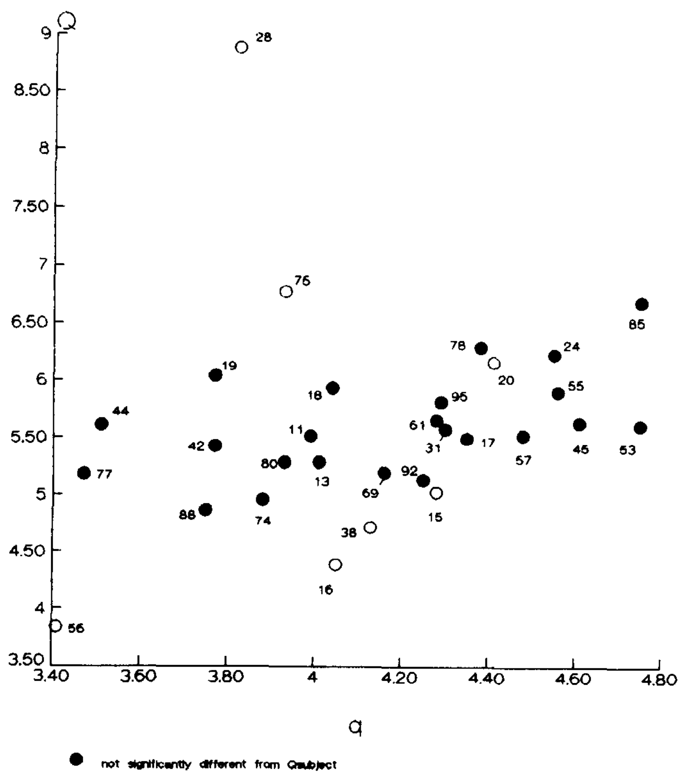

Fig. 2. Average CMP journals.

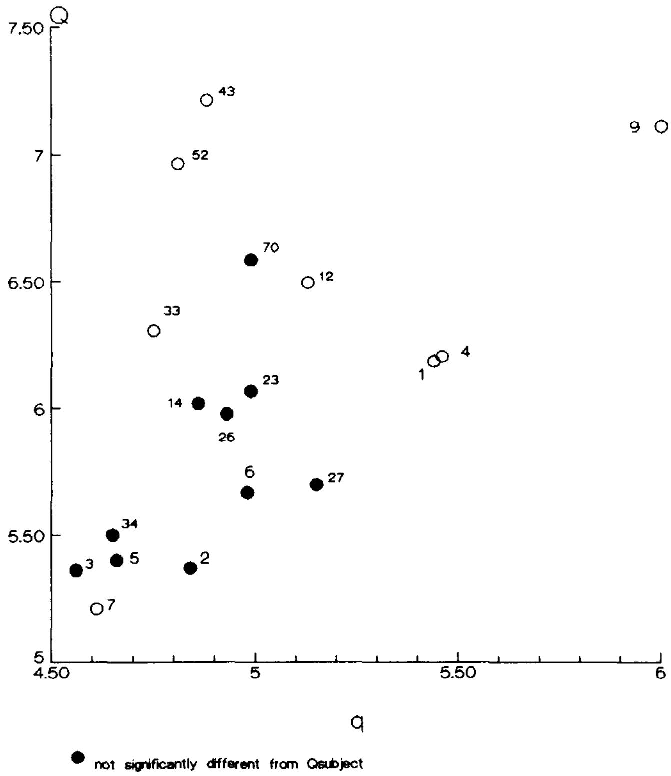

Fig. 3. General CMP journals.

the number of subject headings under consideration: $q_{Whit} = (n + 3)/4$ [3]. Of the 95 CMP journals only three have q-values significantly greater (on a 95% confidence level) than $q_{Whit} = 5$. These journals (PHYS REV L, PHYS REV B, FIZ TVERD T) cover the subject more uniformly than the Whitworth distribution. The article partitions of 21 journals over the 17 subject subdivisions do not differ significantly from the Whitworth distribution (2, 6, 12, 14, 23, 24, 26, 27, 33, 34, 43, 45, 52, 53, 55, 57, 70, 78, 85, 92, 95).

Further, Pratt's relative measure of dispersion is calculated in order to establish the similarity between article partitions and the average one when the subject headings are identified, i.e., arranged according to the decreasing frequencies of the column sums (the subject distribution). A suitable measure of significance is also introduced. It appears that one general journal (PHYS ST S-A), four average (DAN SSSR, UKR FIZ ZH, JPN J AP 2, J PHYS F), and 23 specialized journals favor the larger subject subdivisions (see lower parts of Figs. 1-3). The smaller subdivisions are preferred correspondingly by seven general, three average, and seven specialized journals (see upper parts of Figs. 1-3).

This representation of journals according to their q- and Q-values should not be considered as a reduction of the initial dimensions (subject headings). Such displaying in two dimensions is rather relevant to visualize journal broadness and specificity (or distinctness) as compared to an average subject value but not between-journal similarity.

CONCLUSION

The suitability of such an approach consists mainly in:

- computerized extraction of the data and formation of the journal-by-heading table;
- easy calculation and interpretation of the measures and statistics used;
- the fact that a discipline-oriented file is used — in this way a great number of journals relevant to the selected (sub)field are taken into account, irrespective of pub-

lication language, inclusion in the Science Citation Index, or use in a particular library.

In view of these advantages (as compared to other quantitative techniques), the method could be applied by library staffs and information scientists in classifying a large number of journals according to the two measures of subject scope, namely range (broadness) and specificity (distinctness), as well as w-statistic.

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