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Indian Journal of Pure and Applied Mathematics: A Bibliometric Survey, 1998-2017

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ABSTRACT

The study describes and analyses key bibliometric patterns of 20370 citations appended to 1561 research articles published in Indian Journal of Pure and Applied Mathematics during 1998-2017. A demographic analysis is done to comprehend the chronological growth and authorship pattern ofIndian and foreign contributors associated with different educational and research institutes of the world. Further geographical distribution (nationally and internationally) of contributions along with their pagination is carried out. We have usedtraditional manual data analysis technique to reach at the conclusions.

KEYWORDS: *Bibliometrics; Indian Journal of Pure and Applied Mathematics; Scientometrics; Citation analysis; Mathematics literature*

INTRODUCTION

Although statistical studies on scientific bibliographies are being conducted since the twenties of the last century, Alan Pritchard (1941-2015) was the first to coin the term 'Bibliometrics' in 1969 as the "application of mathematics and statistical methods to books and other media of communication (Pritchard, 1969)." It is the study dealing with qualification of written communication helping in the measurement of the published knowledge (Ramakrishna & Babu, 2007). Bibliometric patterns are employed "to identify the publication, authorship and citation analysis with the hope that such

regularities can give an insight into the dynamics of the area under consideration (Schrader, 1985)."

In India, this type of study seems to have been first published by S. Dutta and T. S. Rajagopalan in 1958 when they conducted "a survey on literature citations of scientific and technical periodicals (Dutta & Rajagopalan, 1958)." Till 2014, more than twelve hundred bibliometric studies have been published in India (Garg & Tripathi, 2018).

PROBLEM

It is to investigate research articles published in *Indian Journal of Pure and Applied Mathematics (IJPAM)*, and to study their authorship pattern and other characteristics. We have found 1561 research articles published during 1998-2017 to take a census of them using their bibliographical details including references and authors' affiliations.

BACKGROUND TO THE PROBLEM

IJPAM is one the leading research journals of Mathematics which was launched in 1970 as the official publication of the Indian National Science Academy (INSA), New Delhi. From the very beginning it is attracting the attention of the researchers in all areas of Pure and Applied Mathematics, Statistics and other allied areas of mathematical sciences such as algebra, analysis, geometry, topology, number theory, differential equations, operations research, mathematical economics, mathematical biology, mathematical physics and computer science. It enjoys good reputation and popularity at international level in terms of research papers and worldwide distribution. It is being indexed in many international abstracting and indexing services including the Science Citation Index, Current Contents, Mathematical Reviews, INSPEC Science Abstracts (Part A) etc. (Indian Journal of Pure & Applied Mathematics, 2021).

The journal was quarterly in the beginning but due to the tremendous growth in the number of articles to be published, it became a bimonthly publication in 1972 and monthly the very next year i.e., 1973. After a gap of 34 years *i.e.,* 2006 it once again became bimonthly. For various reasons, it has been changed to quarterly from 2016. Now-a-days the journal is being co-published by Springer (India) (Narang, 2004).

OBJECTIVES

The objectives of the present study are to examine a cluster of questions concerning the population of articles published by IJPAM during 1998-2017. Basic questions are as follows:

- How many and of what length were the research articles published by IJPAM during a couple of decades (1998-2017)?
- What were the numbers, forms and average of cited documents?
- Were the contributions products of author collaboration or of individual effort?
- Who were the contributing authors, in terms of professional status and geographical location?
- Finally, what were the major shifts in IJPAM over the study period from 1998 to 2017?

SCOPE

An attempt has been made to investigate the research articles in 164 issues of 20 years of IJPAM (1998-2017).

METHODOLOGY

Data pertaining to 1561 research articles in 20 volumes was collected. The data for volumes 29-43 has been taken from the earlier study (Narang & Singh, 2014) and the data for volumes 43-48 has been noted, observed, tabulated and analysed afresh. The cumulative data has been tabulated and analysed to study the progress and development of IJPAM during 1998-2017. The study uses traditional manual data analysis technique to reach a conclusion.

RESULTS AND DISCUSSION

Distribution of research articles

As clear from the table 1 the total number of research articles published in 164 issues of 20 volumes is 1561 of which the highest number of articles are shown in volume 32 (174) closely followed by 172 articles in volume 33. Volume 34 is having 160 articles whereas volume 31 ranks fourth among others. Volume

32 appears to be most rich and fruitful volume as far as number of contributions is concerned in 20 volumes under study.

Table 1: Distribution of research articles (volume wise)

Year	Volume no.	No. of issues	No. of research articles
1998	29	12	118
1999	30	12	124
2000	31	12	149
2001	32	12	174
2002	33	12	172
2003	34	12	160
2004	35	12	115
2005	36	12	51
2006	37	06	28
2007	38	06	47
2008	39	06	34
2009	40	06	27
2010	41	06	43
2011	42	06	30
2012	43	06	38
2013	44	06	48
2014	45	06	56
2015	46	06	61
2016	47	04	46
2017	48	04	40
Total	**20 Vols.**	**164**	**1561**

Table 1.2 presents the distribution of research articles (issue wise). IJPAM was a monthly publication from the year 1973 and in 2006 it became bimonthly. After a gap of ten years (2016) its periodicity has been changed to quarterly. With the sharp decrease in number of issues, the number of articles has reduced to less than half. The volumes under study are from 29 to 48. Out of these 20 volumes, volumes 29 to 36 are monthly and from the volume 37 to 46 the periodicity is bimonthly. The last two volumes are quarterly.

Table 1.2: Distribution of research articles (issue wise)

	29	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	
Jan	09	10	09	15	13	15	12	04	-	-	-	-	-	-	-						
Feb	10	10	11	14	13	15	14	03	03	04	05	04	20	04	05	05	09	10			
Mar	12	10	10	14	13	12	12	04	-	-	-	-	-	-					10	07	
April	10	10	10	14	14	14	11	04	05	04	07	05	04	04	05	07	06	10			
May	10	10	11	13	15	14	12	04	-	-	-	-	-	-	-						
June	10	10	15	14	14	16	10	04	05	06	06	05	06	05	07	09	09	10	11	12	
July	07	10	15	14	17	12	10	04	-	-	-	-	-	-	-						
Aug.	09	10	15	13	16	14	08	05	05	13	06	04	05	04	08	08	10	10			
Sep.	10	12	11	17	14	12	07	05	-	-	-	-	-	-	-				13	11	
Oct.	11	11	15	18	14	12	08	05	05	12	05	04	04	08	08	09	09	11			
Nov.	10	11	12	13	10	12	06	04	-	-	-	-	-	-	-						
Dec.	10	10	15	15	19	12	05	05	05	08	05	05	04	05	05	10	13	10	12	10	
Total	**118**	**124**	**149**	**174**	**172**	**160**	**115**	**51**	**28**	**47**	**34**	**27**	**43**	**30**	**38**	**48**	**56**	**61**	**46**	**40**	**1561**

Data in Table 1.3 further shows that out of volumes whose periodicity is monthly, volume 32 contains maximum articles (174) and the volumes whose periodicity is bimonthly, volume 46 has maximum contributions (61). Quarterly published volumes (47-48) contain 86 research articles, 46 in volume 47 and 40 in 48 volume.

Table 1.3: Distribution of research articles (periodicity wise)

Sr. No.	Monthly		Bimonthly		Quarterly	
	Volume no.	No. of contributions	Volume no.	No. of contributions	Volume no.	No. of contributions
1	29	118	37	28	47	46
2	30	124	38	47	48	40
3	31	149	39	34	-	-
4	32	174	40	27	-	-
5	33	172	41	43	-	-
6	34	160	42	30	-	-
7	35	115	43	38	-	-
8	36	51	44	48	-	-
9	-	-	45	56	-	-
10	-	-	46	61	-	-
	8 Vols.	**1063**	**10 Vols.**	**412**	**2 Vols.**	**86**

Table 1.4 highlights decade wise distribution of articles. The first decade under the study covers more articles (1138) than the second (423).

Table 1.4: Distribution of research articles (decade wise)

Decade	No. of contributions	% age
1998-2007	1138	73
2008-2017	423	27
Total	**1561**	**100**

Authorship

Table 2 reveals that two-authored publications (708) are at the top followed by the single-authored papers (544). Three authored contributions are 268 (17.2%) and 41 research papers written by more than three authors come at last.

Table 2: Authorship pattern of contributions

No. of authors	No. of contributions	% age
One	544	34.8
Two	708	45.4
Three	268	17.2
More than three	41	02.6
Total	**1561**	**100**

Table 2.1 further represents that the predominance of single-author research articles has been observed in 5 volumes (29, 34, 38, and 43), whereas the predominance of two authored papers is observed in 15 volumes (30-33, 35-36, 39-42, 44-48). This proves that two authored publications is a significant trend in Mathematics. The reason to be attributed to this may be that the joint authorship is between the supervisor and the scholar as mathematical research comprises mostly of giving new results and extensions of already proved results, theorems, etc. to more general situations.

Table 2.1: Authorship pattern of publications (volume wise)

Vol. No.	One author	Two authors	Three authors	More than three authors	Total
29	52	39	24	03	118
30	49	59	14	02	124
31	50	67	30	02	149
32	54	89	30	01	174
33	54	98	15	05	172
34	61	59	37	03	160
35	42	56	15	02	115
36	17	22	09	03	51
37	10	10	06	02	28
38	19	17	10	01	47
39	11	16	07	-	34
40	09	13	04	01	27
41	13	25	05	-	43
42	09	13	05	03	30
43	20	07	11	-	38
44	12	23	12	01	48
45	12	28	11	05	56
46	23	24	10	04	61
47	10	25	08	03	46
48	17	18	05	-	40
20 Vols.	**544**	**708**	**268**	**41**	**1561**

Indian and foreign publications (volume wise)

Table-3 shows that Indian publications are less and their number (636) is lagging behind the foreign papers (925).

Table 3: Indian and foreign papers (volume wise)

Sr. No.	Year	Volume	Indian contributions	Foreign contributions	Total
1	1998	29	58	60	118
2	1999	30	65	59	124
3	2000	31	78	71	149
4	2001	32	87	87	174
5	2002	33	84	88	172
6	2003	34	60	100	160
7	2004	35	41	74	115
8	2005	36	16	35	51
9	2006	37	08	20	28
10	2007	38	13	34	47
11	2008	39	11	23	34
12	2009	40	04	23	27
13	2010	41	17	26	43
14	2011	42	07	23	30
15	2012	43	04	34	38
16	2013	44	16	32	48
17	2014	45	10	46	56
18	2015	46	19	42	61
19	2016	47	23	23	46
20	2017	48	15	25	40
Total			**636**	**925**	**1561**
% age			**40.7**	**59.3**	**100**

Table 3.1 presents the analysis of Indian articles along with their institutional backgrounds. The data shows that the maximum number (337) contributors are university teachers followed by research institutions (149) and 127 contributors are from colleges and only 23contributors are from various other institutions and academies.

Table 3.1: Indian contributors (affiliation wise)

Year	Volume	University	College	Institute	Others	Total
1998	29	36	11	09	02	58
1999	30	37	13	10	05	65
2000	31	40	27	10	01	78
2001	32	52	20	12	03	87
2002	33	50	20	12	02	84
2003	34	26	12	17	04	59
2004	35	24	11	05	01	41
2005	36	12	02	02	-	16
2006	37	05	01	02	-	08
2007	38	06	04	03	-	13
2008	39	04	-	07	-	11
2009	40	02	-	02	-	04
2010	41	07	01	08	01	17
2011	42	02	01	03	01	07
2012	43	01	-	02	01	04
2013	44	07	01	09	-	17
2014	45	05	01	02	-	08
2015	46	10	-	09	-	19
2016	47	05	01	16	01	23
2017	48	06	01	09	01	17
Total		**337**	**127**	**149**	**23**	**636**
% age		**53**	**20**	**23**	**04**	**100**

Table 3.2 exhibits the articles by foreign contributors. Here the data shows that majority of the foreign contributors (83.5%) are from universities followed by 8.4% from the research institutes and 5.5% are college teachers and contributors from other institutes are only 2.6%.

Table 3.2: Foreign contributors (affiliation wise)

Year	Volume	University	College	Institute	Others	Total
1998	29	53	01	03	03	60
1999	30	45	04	08	01	59
2000	31	64	02	04	01	71
2001	32	68	09	08	02	87
2002	33	75	02	11	-	88
2003	34	87	03	04	06	100
2004	35	64	02	06	02	74
2005	36	30	01	03	01	35
2006	37	16	03	01	-	20
2007	38	28	03	03	-	34
2008	39	21	-	02	-	23
2009	40	16	02	05	-	23
2010	41	23	02	01	-	26
2011	42	20	02	01	-	23
2012	43	27	01	04	01	34
2013	44	27	04	-	-	31
2014	45	39	03	03	03	48

2015	46	30	05	06	01	42
2016	47	17	01	04	01	23
2017	48	22	01	01	02	26
Total		**772**	**51**	**78**	**24**	**925**
% age		**83.5**	**5.5**	**8.4**	**2.6**	**100**

Citation Analysis

Table 4 depicts the distribution of citations volume wise and table 4.1 presents the average citations per volume. The data reveals that the average of citations in volume 48 is highest (20.47), followed by volume 46 (19.36) and volume number 47 ranks third (18.02) as regards the average citations. This results in to conclude that now the authors are citing more and more sources in the preparation of their research papers.

Table 4: Volume wise distribution of citations

Volume no.	No. of citations	No. of contributions
29	1284	118
30	1346	124
31	1703	149
32	2016	174
33	2047	172
34	1792	160
35	1314	115
36	691	51
37	401	28
38	600	47
39	439	34
40	326	27
41	706	43
42	455	30
43	666	38
44	787	48
45	968	56
46	1181	61
47	829	46
48	819	40
Total	**20370**	**1561**

Table 4.1: Average citations per contribution in each volume

Vol. No.	No. of contributions	No. of citations	Average
29	118	1284	10.88
30	124	1346	10.85
31	149	1703	11.42
32	174	2016	11.58
33	172	2047	11.88
34	160	1792	11.02
35	115	1314	11.43
36	51	691	13.55
37	28	401	14.32
38	47	600	13.04
39	34	439	12.91
40	27	326	13.04
41	43	706	16.41
42	30	455	15.16
43	38	666	17.52
44	48	787	16.39
45	56	968	17.28
46	61	1181	19.36
47	46	829	18.02
48	40	819	20.47
Total	**1561**	**20370**	**13.04**

Table 4.2 presents the types of cited documents and the table 4.3 shows their data per volume. The data shows that the journal articles (75.4%) are much used sources of information in the writing of articles followed by books (17.8%) and others sources including theses, dissertations, conference proceedings etc. contribute very little in the preparation of literature (6.8%).

Table 4.2: Forms of documents cited

Items	No. of citations	% age
Books	3634	17.8
Research journals	15352	75.4
Others	1384	6.8
Total	**20370**	**100**

Table 4.3: Forms of documents cited (volume wise)

Vol. No.	Books	Research articles	Others	Total
29	271	938	75	1284
30	240	1031	75	1346
31	355	1268	80	1703
32	429	1467	120	2016
33	381	1551	115	2047
34	301	1396	95	1792
35	259	995	60	1314
36	107	528	56	691
37	58	335	08	401
38	97	463	40	600
39	104	298	37	439
40	44	245	37	326
41	172	408	126	706
42	93	292	70	455
43	126	400	140	666
44	148	575	64	787
45	143	792	33	968
46	80	1081	20	1181
47	93	696	40	829
48	133	593	93	819
Total	**3634**	**15352**	**1384**	**20370**

Pagination

Table 5 depicts the data relating to the number of pages in each volume. Volume 33 has maximum pages (1972) followed by volume 32 which has 1954 pages and volume 34 stood at third place with 1844 pages.

Table 5: Pagination pattern of contributions

Volume	Total No. of pages	No. of articles
29	1310	118
30	1310	124
31	1726	149
32	1954	174
33	1972	172
34	1844	160
35	1426	115
36	738	51
37	388	28
38	630	46
39	538	34
40	418	25
41	774	43
42	534	30
43	674	38
44	904	48
45	1028	56
46	920	61
47	739	46
48	703	40

Table 5.1 shows the average number of pages per contribution in each volume under study. The data analysis shows that in the volume 44, the average pages per contribution is 18.83 followed by volume 45 with 18.4 pages and volume 41 comes at the third place with average number of pages (18) per contribution.

Table 5.1: Average pages per research article

Vol. No.	Total pages	No. of articles	Average pages
29	1310	118	11.10
30	1310	124	10.56
31	1726	149	11.58
32	1954	174	11.22
33	1972	172	11.46
34	1844	160	11.53
35	1426	115	12.4
36	738	51	14.47
37	388	28	13.86
38	630	46	13.7
39	538	34	15.82
40	418	25	16.72
41	774	43	18
42	534	30	17.8
43	674	38	17.73
44	904	48	18.83
45	1028	56	18.4
46	920	61	15.08
47	739	46	16.1
48	703	40	17.6

Geographical distribution of publications

Table 6 presents the data of publications distributed among participating countries. Out of the total 1561 contributions, 636 contributions have been made by Indian scholars and rest of the 925 research articles have been written by scholars from other countries. Out of 925 foreign contributions the top contributor is China with 340 contributions followed by Turkey (92) and Korea (87). This proves that Chinese researchers rank second after India in IJPAM.

Table 6: Country wise distribution of research articles

Sr. No.	Country	No. of articles	Rank
1	India	636	1
2	China	340	2
3	Turkey	92	3
4	Korea	87	4
5	Egypt	47	5
6	USA	45	6
7	Iran	44	7
8	Spain	26	8
9	Saudi Arabia	21	9
10	Yugoslavia	16	10
11	Italy	13	11
12	Poland	13	11
13	Tunisia	13	11
14	Japan	12	12
15	Russia	12	12
16	Bangladesh	11	13
17	France	10	14
18	Canada	09	15
19	UK	09	15
20	Nigeria	08	16
21	Pakistan	08	16
22	Romania	08	16
23	Bulgaria	07	17
24	South Africa	06	18
25	Taiwan	06	18
26	Australia	04	19
27	Hungary	04	19
28	Mexico	04	19
29	Germany	03	20
30	Greece	03	20
31	Morocco	03	20
32	Philippines	03	20
33	Argentina	02	21
34	Finland	02	21
35	Hong Kong	02	21
36	Kuwait	02	21
37	Lebanon	02	21
38	Serbia	02	21
39	Syria	02	21
40	Thailand	02	21
41	Vietnam	02	21
42	Algeria	01	22
43	Austria	01	22
44	Brazil	01	22
45	Brunei	01	22
46	Cameroon	01	22
47	Croatia	01	22
48	Denmark	01	22
49	Estonia	01	22
50	Indonesia	01	22
51	Ireland	01	22
52	Israel	01	22
53	Jordan	01	22
54	Lithuania	01	22
55	Malaysia	01	22
56	Norway	01	22
57	Portugal	01	22
58	Qatar	01	22
59	Singapore	01	22
60	Slovakia	01	22
61	Slovenia	01	22
	Total	**1561**	

Table 6.1 gives state wise distribution of articles (rank wise) of Indian mathematicians. The data shows that Uttar Pradesh is the top contributor (92). This may be attributed to the reason that the number of educational and research institutes in U.P. is also high. Delhi stands at the second place with 73 contributions, closely followed by Tamil Nadu (70), West Bengal (68) and so on.

Table 6.1: Indian State wise distribution of research articles

Sr. No.	State/Union territory	No. of articles	Rank
1	Uttar Pradesh	92	1
2	Delhi	73	2
3	Tamil Nadu	70	3
4	West Bengal	68	4
5	Maharashtra	47	5
6	Karnataka	42	6
7	Himachal Pradesh	34	7
8	Punjab & Chandigarh	34	7
9	Andhra Pradesh	27	8
10	Assam	25	9
11	Haryana	24	10
12	Odisha	17	11

13	Madhya Pradesh	15	12
14	Bihar	08	13
15	Pondicherry	08	13
16	Kerala	07	14
17	Rajasthan	07	14
18	Tripura	07	14
19	Gujarat	06	15
20	Jammu	06	15
21	Uttarakhand	06	15
22	Uttaranchal	05	16
23	Meghalaya	03	17
24	Arunachal Pradesh	01	18
25	Chhattisgarh	01	18
26	Jharkhand	01	18
27	Mizoram	01	18
28	Telangana	01	18
	Total	**636**	

CONCLUSION

Above analysis of data has unfolded many important facts. At the time of inception in 1970, the IJPAM was published quarterly and it became bimonthly in 1972 and monthly in 1973. After a gap of 32 years the journal once again became bimonthly in 2006. Now it is being published quarterly from 2016. Initially it was solely published by INSA, New Delhi but now the journal is co-published by Springer (India) from 2010 onward. The volume 1 had 70 articles[6] and maximum number of articles (174) appeared in volume 32 published in 2001 and since then the number of contributions has been decreasing. There is a predominance of two authored contributions (45.4%) followed by single authored contributions (34.8%). Foreign contributors (925) are more than the Indian contributors (636).Indian contributions show that 53% articles have been written by university teachers followed by 23% by the researchers from different institutes. Foreign contributions show that 83.5% contributions are by university teachers whereas 8.4% by persons working in research institutes. Maximum number of citations (2047) has been seen in volume 33 published in 2002. Citations of journal articles 75.4% are maximum followed by the citations of books *i.e.,* 17.8% and other sources of information are of 6.8%. Volume 33 has maximum number of pages (1972) followed by the volume 32 with 1954 pages. The geographical distribution of contributions among various nations shows that India is the top contributor with 636 articles followed by China (340), Turkey (92) and Korea (87). The national geographical distribution of contributions among Indian states shows that Uttar Pradesh is the top contributor with 92 articles followed by Delhi (73) and Tamil Nadu (70).

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REFERENCES

1. Pritchard, Alan. (1969). Statistical bibliography or bibliometrics? *Journal of Documentation*. 25(4), 348-349.
2. Ramakrishna, J. & Babu, Ramesh B. (2007). Literature on hepatitis (1984-2003): a bibliometric analysis. *Annals of Library and Information Studies*. 54(4), 195-200.
3. Schrader, Alvin M. (1985). A bibliometric study of the JEL, 1960-1984. *Journal of*

Education for Library and Information Science. 25(4), 279-300.

4. Dutta, S. & Rajagopalan, T.S. (1958). Literature citations in scientific & technical periodicals: a survey. *Journal of Scientific and Industrial Research.* 37A, 259-261.
5. Garg, K.C. & Tripathi, H.K. (2018). Bibliometrics and Scientometrics in India: an overview of studies during 1995-2014. *Annals of Library and Information Studies*. 65, 7-42.
6. Narang Asha. (2004). Indian Journal of Pure and Applied Mathematics: a bibliometric study. *Annals of Library and Information Studies*. 51(1), 28-38.
7. Indian Journal of Pure and Applied Mathematics. Retrieved from: *https://www.insaindia.res.in/ijpam.php*
8. Indian Journal of Pure and Applied Mathematics. Retrieved from: *https://www.springer.com/journal/*13226
9. Narang Asha & Anil Kumar. (2010). A bibliometric study of Indian Journal of Pure and Applied Mathematics. *SRELS Journal of Information Management.* 47(1), 31-39.
10. Narang Asha & Sukhdev Singh. (2014). Bibliometric analysis of Indian Journal of Pure and Applied Mathematics. *SRELS Journal of Information Management*. 51(2), 99-109.

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