

Cost/page and cost/page/impact factor data for selected mathematics journals.

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As an aside, while I am formally the Chemistry Librarian at Caltech, I also serve as a general reference librarian which includes both the mathematics and physics collections.

Mathematicians are widely known for their reluctance to archive older journal volumes, and probably even more resistant to cancellations. I can certainly sympathize with them, ... because the journal collection really is their 'lab equipment'. Thus, I have found, over the years, that comparisons of journal prices have very little resonance with the math faculty, especially when one of their favorites is at the top of the most expensive list.

We have found, however, that they will listen a little when presented with cost/page and cost/page/IP data. This data serves as a nice 'warm up' for locally produced cost/use data, which then forms the basis for our subscription evaluations.

Let's look at some data for various journals and then we will look at some cost/page data. First, is the question of which journals to compare. From ISI's 2003 Journal Citation Reports, one possibility would be 'total cites' ... (although this obviously over-ranks journals with a long publishing history and/or a large number of articles). The data on the first overhead (1) gives the 'total cites' during 2003 ... to any article ever published in the journal, ... the year the journal began publication and ... the number of articles published in 2003.

Another possible ranking would be by 'ISI Impact Factors'(2), which presumably have some relation to the quality of a journal's articles. Since we are comparing journals with widely varying numbers of articles, an additional consideration is the data used to calculate the 2003 Impact Factors, namely the number of cited references in 2003 articles to articles published in 2001 and 2002 divided by total number of 2001 & 2002 articles. When comparing by Impact Factors, I think it is important not to include journals with very small numbers of published articles. The data shown here is the 2003 Impact Factor and the ratio of 2003 cites to the sum of the 2001+2002 articles.

I also have some historical Impact Factor data from the ISI web site (3). This historical data is very interesting ... since its the same six titles, with the exception of the Journal of Differential Geometry

'replacing' JAMS in the 1981-2000 listing (presumably because JAMS didn't begin publishing until 1988). This historical Impact Factor data suggests that mathematics papers may be slower to digest and take a little longer to become highly cited, compared with other fields. This might be an interesting research project ... to compare historical Impact Factor data for mathematics journals with other science journals ... to see if there are significant differences. It is also interesting that the only journals from the major commercial publishers on this list are Wiley's Communications in Pure & Applied Mathematics (which is actually issued by the Courant Institute) and Springer's Inventiones Mathematicae (presumably the only truly commercial journal).

For purposes of a cost/page comparison, I took titles from the previous lists and these are shown on the overhead (4). The cost/page data comes from the AMS Journal Price Survey.

<http://www.ams.org/membership/journal-survey.pdf>

and Ulf Rehmann's ' Math Journal Price Survey, based on AMS 2004 data at:

<http://www.mathematik.uni-bielefeld.de/~rehmann/BIB/AMS/Publisher.html>

The 2003 cost/page data is interesting in the sense that the AMS journals are priced at less than 30 cents per page, the former Academic Press journals at 60 cents/page and most of the other commercial journals at nearly \$1 ... or more. I certainly understand the need for commercial publishers to 'make a profit' but since Academic/Elsevier is able to do this at \$0.60/page, it suggests that the other commercial journals might be more than a little overpriced. Please note that in references 4 and 5, a second value has been calculated for the slightly (13%) larger page size of Elsevier journals. Assuming \$0.60/page will provide a reasonable profit:

Mathematische Annalen (Springer) could have been priced in 2003 at \$1479 instead of \$2689.

Numerical and Linear Algebra (Wiley) could have been priced in 2003 at \$439 instead of \$940.

Discrete Mathematics (Elsevier) could have been priced in 2003 at \$3266 instead of \$4533 (based on \$0.82/page cost).

The cost/page/Impact Factor data (5) provides another interesting comparison. The AMS journals, after normalizing on JAMS are clearly the most cost effective. The interpretation here is that the larger the normalized value the less cost-effective the title. Thus, JAMS is 6x as cost-effective as J. Funct. Anal., about 12x as cost-effective as J. Math. Anal. Appl. and Comput. Geomet. To be as cost-effective as JAMS:

Journal of Functional Analysis would have been priced at \$506 instead of \$3034.

Journal of Mathematical Analysis and Applications would have been priced at \$427 instead of \$5124

Computational Geometry would have been priced at \$96 instead of \$842 (based on \$0.96/page).

| 1. Journal              | Cites | (v.1)  | Cites2003 |
|-------------------------|-------|--------|-----------|
| Tr. Am. Math. Soc.      | 6331  | (1900) | 235       |
| J. Math. Anal. Appl.*   | 5275  | (1960) | 624       |
| Ann. Math.              | 5028  | (1884) | 39        |
| Proc. Am. Math. Soc.    | 4620  | (1950) | 476       |
| Invent. Math.**         | 4132  | (1966) | 65        |
| Comm. P&A Math.***      | 3812  | (1949) | 54        |
| J. Algebra*             | 3621  | (1964) | 380       |
| Math. Annalen**         | 3523  | (1869) | 105       |
| J. Funct. Analysis*     | 3299  | (1967) | 179       |
| J. Differential Equat.* | 3196  | (1965) | 211       |
| Duke Math. J.           | 2586  | (1935) | 86        |
| Discrete Math.****      | 2577  | (1971) | 362       |
| Math. Z.**              | 2562  | (1918) | 121       |
| Nonlinear Anal.****     | 2549  | (1976) | 321       |
| J. Reine. Ang. Math.#   | 2363  | (1826) | 105       |
| Am. J. Math.            | 2353  | (1878) | 41        |

\*Academic/Elsevier

\*\*Springer

\*\*\*Wiley

\*\*\*\*Elsevier

# de Gruyter

## Gauthier-Villars/Elsevier

| 2. Journal (2003)      | IP    | Cites/Art. |
|------------------------|-------|------------|
| Bull. Am. Math. Soc.   | 3.65  | 62/17      |
| J. Am. Math. Soc.      | 2.46  | 113/46     |
| Comm. P&A Math.***     | 2.25  | 189/84     |
| Found. Comp. Math.**   | 1.87  | 56/30      |
| Acta Math.             | 1.79  | 52/29      |
| Ann. Math.             | 1.51  | 143/95     |
| Disc. Cont. Dyn. Syst. | 1.50  | 173/115    |
| Invent. Math.**        | 1.32  | 188/143    |
| Duke Math. J.          | 1.22  | 215/176    |
| J. Math. Pure Appl.##  | 1.12  | 101/90     |
| Mem. Am. Math. Soc.    | 1.10  | 65/59      |
| J. Algebraic Geometry  | 1.08  | 55/51      |
| Num. Linear Algebr.*** | 1.04  | 74/71      |
| Comput. Geometry****   | 1.01  | 77/76      |
| Calculus Variat. ...** | 1.01  | 88/87      |
| J. Funct. Anal.*       | 0.99  | 285/287    |
| Am. J. Math.           | 0.962 | 77/80      |
| Math. Annalen**        | 0.95  | 217/207    |

### 3. ISI Historical impact data

2000

1996-2000

1981-2000

BAMS (2.75) / Acta Math(3.78) / Ann Math (19.10)

Acta Math(1.94) / JAMS(3.70) / CP&AM(17.21)

JAMS(1.68) / BAMS(3.44) / Acta Math(15.96)

CP&AM(1.67) / CP&AM(3.24) / J Diff Geo(13.59)

Inv Math(1.61) / Ann Math(3.12) / Inv Math(13.42)

Ann Math(1.54) / Inv Math(3.08) / BAMS (11.98)

[http://www.in-cites.com/research/2001/oct\\_15\\_2001-2.html](http://www.in-cites.com/research/2001/oct_15_2001-2.html)

| 4. Journal          | 2000<br>c/p        | 2003<br>c/p        | %            |
|---------------------|--------------------|--------------------|--------------|
| J. Am. Math. Soc.   | \$0.21             | \$0.24             | 14%          |
| Pr. Am. Math. Soc.  | \$0.20             | \$0.23             | 15%          |
| T. Am. Math. Soc.   | \$0.21             | \$0.29             | 38%          |
| J. Funct. Analysis* | \$0.55             | \$0.60             | 9%           |
| J. Math. Anal. Ap.* | \$0.52             | \$0.60             | 15%          |
| Invent. Math.**     | \$1.01             | \$1.07             | 6%           |
| Math. Annalen**     | \$0.94             | \$1.09             | 16%          |
| Com. P&A Math.***   | \$1.19             | \$1.27             | 7%           |
| Num. Lin. Alg.***   | \$0.95             | \$1.28             | 35%          |
| Comput. Geom.****   | \$0.93             | \$1.13             | 22%          |
| Discrete Math.****  | \$0.75<br>(\$0.64) | \$0.96<br>(\$0.82) | 28%<br>(25%) |

\*Academic/Els. \*\*Springer \*\*\*Wiley \*\*\*\*Elsevier

| 5. Journal (2003)   | cost/pg(IP)   | cost/pg/IP | N    |
|---------------------|---------------|------------|------|
| J. Am. Math. Soc.   | \$0.24(2.457) | 0.10       | 1    |
| T. Am. Math. Soc.   | \$0.29(0.807) | 0.36       | 3.6  |
| Com. P&A Math.***   | \$1.27(2.250) | 0.56       | 5.6  |
| Pr. Am. Math. Soc.  | \$0.23(0.389) | 0.59       | 5.9  |
| J. Funct. Analysis* | \$0.60(0.993) | 0.60       | 6.0  |
| Invent. Math.**     | \$1.07(1.315) | 0.81       | 8.1  |
| Comput. Geom.****   | \$1.13(1.013) | 1.12       | 11.2 |
|                     | \$0.96(1.103) | 0.87       | 8.7  |
| Math. Annalen**     | \$1.09(0.954) | 1.14       | 11.4 |
| Num. Lin. Alg.***   | \$1.28(1.042) | 1.23       | 12.3 |
| J. Math. Anal. Ap.* | \$0.60(0.473) | 1.27       | 12.7 |
| Discrete Math.****  | \$0.96(0.303) | 3.17       | 31.7 |
|                     | \$0.82(0.303) | 2.71       | 27.1 |

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