Mathematical Journals

UIUC Department of Mathematics
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A.J. Hildebrand
hildebr@math.uiuc.edu

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Publication of mathematical research is almost always done in the form of journal articles. Books have their place in mathematics, as textbooks, reference works, or monographs (an exposition of an area in mathematics at a high level), but it is very rare that original research appears first in book form. (An exception are conference proceedings, which collect articles by speakers at a conference.)

The journal literature is huge: The **MathSciNet Database** covers more than 1900 current mathematical journals; click on the "Journals" tab at the MathSciNet search page, `http://www.ams.org/mathscinet`, to search through this list. For example, a search for "algebra" produces a list of 55 journals whose title includes, or matches, "algebra".

The UIUC Math library carries a few hundred of these journals. Pretty much any mathematical journal you might be interested in is carried by our library. Our library is one of the top three in the U.S., and if there is a journal we don't have, chances are that no other library in the U.S. has the journal.

The main purpose of most of these journals is to publish mathematical research at a professional level. These journals are not meant to be read cover-to-cover; most of the research published there is highly specialized, and few people outside the immediate area of the research will be able to appreciate and understand the material. If I'd pick a random issue of a

random journal, chances are that I wouldn't be able to understand any of the articles.

However, there are journals that try to appeal at a broad audience with a wide range of backgrounds, including undergraduates, and in those journals you are likely to find a lot of interesting mathematics.

The following is an overview of the world of mathematical journals. The first part covers journals of particular interest to undergraduates, the second part deals with professional level journals.

1 Coffee table mathematical journals

By that I mean journals that are accessible, that try to appeal to a broad audience, are meant to be read cover-to-cover (more or less), and make for enjoyable and generally light reading. Those are journals that might want to have on stranded island or read on a long plane ride. They are worth subscribing to (subscription costs are modest compared to other math journals, and subscriptions are sometimes included in society memberships), and whose back issues are worth keeping, even if digitized version are available online.

- **American Mathematical Monthly.** The main publication of the MAA. Very highly regarded, and enjoyable reading. As far as expository journals go, the "Monthly" is as good as it gets; its standards are correspondingly high, and I would guess that the rejection rate is in the 90 percent range. Has a famous "Problems and Solutions" section.

- **Mathematical Magazine.** The articles published here are at a somewhat lower level than the Monthly. Also has a problems section; the problems are somewhat easier than those in the Monthly.

- **College Mathematics Journal.** Comparable to Math. Magazine, and somewhat below the level of the Monthly.

- **Math Horizons.** A glossy, full color, publication that looks more like a regular magazine than a scientific journal. (Copies are available, for free, in the Undergraduate Math Office, 313 Altgeld. Check it out!)

- **Mathematical Intelligencer.** Similar in format and look to Math Horizons.

Note: For the first three of these journals complete archives are available on JSTOR, `www.jstor.org`.

2 Journals for research by undergraduates

Most of these are electronic-only journals, and most are open access. A notable exception is *Involve*, which requires a subscription to access the electronic or the print version. Unfortunately, the U of I does not subscribe, so that journal is not accessible from here.

- **Rose-Hulman Institute of Technology Undergraduate Mathematics Journal.** `www.rose-hulman.edu/mathjournal`.

- **Furman University Electronic Journal of Undergraduate Mathematics.** `http://math.furman.edu/~mwoodard/fuejum/`

- **Morehead Electronic Journal of Applicable Mathematics**. `http://www.moreheadstate.edu//mejam`

- **SIAM Undergraduate Research Online**. `http://www.siam.org/students/siuro/`

- **Involve.** Aims to publish quality research that "involves" students (both undergraduate and graduate) in a substantial manner. `http://pjm.math.berkeley.edu/inv/`

3 Professional mathematical research journals

3.1 Elite journals

Here are a couple of journals that are universally regarded as being the best in mathematics. Those are the mathematical equivalents of the *New York Times*, or the *Wall Street Journal*. These journals aim to publish the very best of mathematical research, and their standards are exceptionally high.

- **Annals of Mathematics.** Published by Princeton University and the Institute for Advanced Study (made famous by Einstein).

- **Inventiones Mathematicae.** Published by Springer Verlag.

- **Journal of the American Mathematical Society.**

3.2 Society journals

The two biggest and most influential mathematical societies are the American Mathematical Society (AMS) and the London Mathematical Society (LMS). Both have a large publication program which includes several journals. Other societies with journals include the Mathematical Association of America, the Society of Industrial and Applied Mathematics (SIAM), Canadian Mathematical Society and the French Mathematical Society. Here are some of the better known society journals. All except the Journal of the AMS have moderately high publication standards, but are well below the "elite" level. Some journals (like the Transactions and Proceedings of the AMS) come in pairs that have a single editorial board, and which complement each other in that one specializes in shorter articles, whereas the other publishes mainly longer articles.

- **Journal of the American Mathematical Society.**

- **Transactions of the American Mathematical Society.**

- **Proceedings of the American Mathematical Society.**

- **Proceedings of the London Mathematical Society.**

- **Journal of the London Mathematical Society.**

- **Journal of the Canadian Mathematical Society.**

3.3 Regional/institutional journals

Some universities are publishing their own journals. Here are some:

- **Duke Mathematical Journal.** Has a very good reputation, close to "elite" level.

- **Illinois Mathematical Journal.**

- **Pacific Mathematical Journal.**

- **Michigan Mathematical Journal.**

- **Indiana University Mathematics Journal.**

- **Rocky Mountain Mathematical Journal.**

3.4 Specialized journals

A large number of journals specialize in a particular area of mathematics. Most of these journals (though there are exceptions) have somewhat lower publication standards than general mathematics journals. One reason for this is that general journals try to appeal to a broader audience and thus may avoid publishing articles that are too narrowly focused. Another reason is that a general journal aims to cover all of mathematics in a uniform manner and thus has room for only a few articles in any given area, whereas a specialized journal may devote all of its space to a particular area. Articles that are highly technical and appeal only to a few specialists in the area are not likely to get published in a general journal, but may be appropriate for a specialized journal. For example, among the articles that are published in the Journal of Number Theory, I would estimate that most (perhaps as many as 70%) would not be accepted for publication in one of the society journals listed above.

Here are some journals in number theory:

- **Acta Arithmetica**

- **Journal of Number Theory**

- **International Journal of Number Theory**

- **Journal de Théorie des Nombres de Bordeaux**

- **The Ramanujan Journal.**

- **Integers: Electronic Journal of Combinatorial Number Theory.** Electronic only.

- **Journal of Integer Sequences.** Electronic only. An offshoot of the "Online Encyclopaedia of Integer Sequences."

- **The Fibonacci Quarterly.** Much broader than the journal's name suggests, and quite accessible at the undergraduate level.

Here is a small selection of other specialized journals:

- **Experimental Mathematics.**

- Mathematics of Computation.

- Journal of Differential Equations.

- Journal of Combinatorial Theory.

- Journal of Symbolic Logic.

- Notre Dame Journal of Formal Logic.

3.5   Society Newsletters and Magazines.

- **Notices of the American Mathematical Society.** Mainly serves as a newsletter for the AMS, but has occasional research articles.

- **Focus.** A similar newsletter by the Mathematical Association of America (MAA).

3.6   Crackpot and vanity journals.

Those shall remain nameless, but there are quite a few of them, and some are even indexed in MathSciNet (though generally not reviewed). In most cases (a notable exception being a journal named after an uninhabited continent), the name of the journal is not a give-away, nor is the production quality. Even the editorial boards are not always an indication of the quality (or lack thereof) of a journal: some fringe journals have top-notch people on their boards.