Opinion

The Internet is changing the way mathematics is done. Online journals, MathSciNet, and the arXiv have existed for some time. More recently a number of blogs have become home to rather sophisticated mathematical discussion [1]. There are also mathematical wikis combining exposition and research (see ncatlab.org/nlab) and several massively collaborative online "Polymath" projects (see polymathprojects.org).

On the new site MathOverflow, users ask and answer focused mathematical questions. They also vote on questions and answers, making it easy to sort out the good stuff. The majority of active participants are faculty and graduate students, including many leading researchers. On a typical day, the site receives about thirty new questions and over 30,000 page views from around 2,500 different users. It's not just the new material each day that matters but the evolving searchable archive of mathematical knowledge.

MathOverflow is a natural tool for mathematicians, since doing mathematics is itself largely driven by asking questions. We often formulate a problem as a series of small focused questions and then try to answer them. Sometimes the answers are surprising and lead to more questions, and off you go on an adventure. Other times you get stuck, in which case you might try looking online. You're likely to find relevant material on MathOverflow, since it is heavily indexed by search engines. Many mathematicians first visit the site by following a search query, so the system is designed to make it easy to jump right in. You can start posting questions and answers without registering. Mathematical symbols, entered as LaTeX between dollar signs, are automatically rendered.

The site has a personal feel to it. Helping someone with his or her problem is satisfying, and it's pleasant to find that somebody has taken the time to help with yours. It's like a global math department tea. You interact with excellent mathematicians of all ages, and you get to do some really fun mathematics. We know of cases where someone asked a question that arose in their research and got a satisfying answer within an hour, or even minutes [2]! The site launched in October of 2009, and questions have already led to research papers with the asker and answerer as coauthors.

When people first visit MathOverflow, they are often surprised by the sophistication of the mathematics. The software allows the community to moderate itself, keeping the site from becoming anarchic. For example, established members of the community have increased power to make decisions. This ability is measured by a point system, somewhat unfortunately called "reputation". Your reputation increases when others vote up your posts. As you contribute more, you gain the ability to organize and improve the site. At first you can only ask and answer questions, but soon you can vote and create new tags. Eventually you can edit other people's posts and vote to close bad questions. Thus, moderation duties are efficiently shared among the most active users.

A "bad question" is one which is either irrelevant to mathematicians or one where it is unclear what constitutes an answer. Blogs often host discussions, and wikis compile expository material; MathOverflow fills a different niche. It is optimized for focused questions which (could) have clear answers. These optimizations make it awkward to use for broad or open-ended questions. You should use MathOverflow only when it is the right tool for the job. The best questions for the site include motivation and background and have a clear goal. Discussions, homework questions, and broad requests are politely directed to more suitable websites.

MathOverflow's underlying software is Stack Exchange, the engine behind the wildly successful programming site Stack Overflow. All contributed content is under the same Creative Commons license used by Wikipedia. Copies of the database are regularly made available for analysis, reproduction, and future proofing.

It is hard to properly explain MathOverflow without showing it to you, so please visit http://mathoverflow.net and poke around! If you have a question *someone* probably knows how to answer, try asking it. If you find the main page overwhelming, go to http://mathoverflow.net/tags and click on a tag corresponding to your specialty. Currently some areas of math are disproportionately represented but, just as with the arXiv, it is gradually filling out as it matures. We're still not sure what the future holds for MathOverflow; this will depend on how the mathematical community decides to use it. We'd love to have mathematicians from more areas actively involved. Already you're sure to find something you're interested in.

References

[1] John Baez, Math blogs, *Notices of the AMS*, March 2010.
[2] "Shtetl-optimized: Prove my lemma, get acknowledged in a paper!", http://scottaaronson.com/blog/?p=432.

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