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The Non-Flaming of an HP Mathematician

Image via Wikipedia

There is an old and rich vein of humor involving the alleged social maladroitness of mathematicians. Sample joke: An extrovert mathematician is one who looks at *your* shoes when he's talking to you.

Recent events online, though, suggest that mathematicians have gotten a bad rap, and that they are in fact models of polite behavior in an increasingly impolite world.

A few days back, Vinay Deolalikar, a mathematician at HP Labs, posted a 98-page paper in which he claimed a proof that "P is not equal to NP." Those who only know of HP as the recent employer of one Mark Hurd may not appreciate that HP Labs is one of the most respected basic research operations in the corporate world. Even fewer people may know that the 40-year old "P equals NP" problem is one of the most famous unsolved problems for mathematicians and their kissing cousins in a field of computer science known as complexity theory.

The heart of the issue is this: If the answer to a computer problem can quickly be verified as being correct, might it also be possible to calculate that answer quickly in the first place? Most people think the answer is no, meaning that Deolalikar is right in saying that P and NP are not the same. But for complicated reasons that the present writer lacks sufficient training to explain in any detail, the theorem has been monstrously difficult to prove, and most quick online commentators doubted Deolalikar had in fact done so.

Many mathematicians and computer scientists, in fact, think we might be decades away from settling the question, on account of the math spadework that needs to be done first. Mathematical ideas only rarely come completely out of the blue; instead, they often build on top of each other. Andrew Wiles became famous for sitting in his attic and solving Fermat's Last Theorem in 1995, but he owed a great deal to an important insight from nine years previous from Ken Ribet at UC Berkeley.

While there have been a number of posts in recent days on math and computer science blogs expressing skepticism, what is striking about the discussion is how civil it is, depite the fact that P=NP, in this world, is about as contentious a topic as can be. The contrast is stark with the hysterical flame wars that make up much of the rest of online debate.

Consider this from Georgia Tech's Richard Lipton and Ken Regan from SUNY Buffalo .

> *We think that Vinay Deolalikar should be thanked for thinking about this difficult problem, and for sharing his ideas with the community. Whether he got it right or not, he has tried to add to our understanding of this great problem. We need more people working on hard problems. If no one does, then they never will be solved.*

Their post, of course, doesn't shy away from listing their concerns. (Sample criticism: "The paper may not handle tupling correctly," though of course you already knew that.)

UPDATE: In fact, in an email to me, which I quote with his permission, Regan defended Deolalikar from criticism that the HP researcher had no business releasing such a seemingly unvetted paper making such an audacious claim about so famous a problem.

> *Actually, we don't honestly think that his releasing the paper was a detriment. First, we think it has some ideas that are capable of genuinely shaking up our field—we're working on a post for tomorrow. Second, IMHO it's actually important for the corporate labs to emphasize that their employees enjoy considerable academic freedom.*

Scott Aaronson of MIT offered $200,000 of his own money – he doesn't have very much — if Deolalikar is proven right. Aaronson made clear that he doesn't expect that to happen, but was somewhat rhapsodic about a world in which it did.

> *If P≠NP has indeed been proved, my life will change so dramatically that having to pay $200,000 will be the least of it.*

> *P ≠NP is exactly the 'expected' answer! But proving that expected answer has been the central goal of the field for 40 years—not so much ... because the answer itself is in serious doubt, as because of how much will need to be learned about computation on the way to the proof. If P≠NP is proved, then to whatever extent theoretical computer science continues to exist at all, it will have a very different character.*

A very different character — something we could all do with a little of.

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