Doubts continue on claim to have solved P vs NP mathematical question

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One of the most complex mathematical problems in the world is proving either that P ≠ NP or P=NP, a riddle that was first formulated in 1971 by mathematicians Leonid Levin and Stephen Cook. The question was one of seven millennium problems set by the Clay Mathematical Institute (CMI) in Cambridge, Massachusetts as being among the most difficult to solve.

Vinay Deolalikar, a computer scientist from Hewlett-Packard's research arm based in Palo Alto, California, claims to have solved the problem and stands to win $1 million if his proof is accepted.

P refers to problems with solutions that are easy to find, in other words P is a class of problems for which an answer can be found in polynomial time. NP refers to problems with solutions that are almost impossible to find, but easy to verify, or in other words a class of problems for which an answer can be verified in polynomial time.

The Clay Mathematical Institute offers the following problem to illustrate NP: you have a list of 400 university students to be accommodated but there is only room in the dormitory for 100 students. The Dean has provided a list of pairs of incompatible students who cannot be on the final list. This is an NP-problem because it is extremely difficult to go through all possible combinations to come up with a list, but very easy to verify once a list is obtained. According to CMI the number of possible combinations is greater than the number of atoms in the universe.

If P ≠ NP some complex problems, such as the one above, could never be solved efficiently and there are serious limits on what computers will be able to accomplish in the future, whereas if P = NP every such problem would have a polynomial time solution. Mr Deolalikar writes that this would have profound implications for applications such as cryptography and on the question of whether or not human creativity could be automated.

Among those skeptical of Deolalikar's claim is Scott Aaronson, assistant professor of electrical engineering and computer science at the Massachusetts Institute of Technology (MIT), who said on his blog that he will personally add $200,000 to the prize, even though he can ill afford it, and he has not read Deolalikar's entire paper. He said if the proof was correct it would change his life so dramatically that "having to pay $200,000 will be the least of it." He later also gave his reasons for being so confident in MIT's technology review.

Another skeptic is Professor Richard Lipton at Georgia Tech College of Computing, who has been working on the P vs NP problem for three decades.

Deolalikar's paper is available online, and is being peer-reviewed by computer scientists. To be considered for the million dollar prize the paper must be published in an approved mathematics publication and must also retain general acceptance by mathematicians two years after the proof is published.

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