

# Re: Svara that Goldbach's Conjecture is Unprovable

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On Mon, 12 Jul 2004, Michael N. Christoff wrote:

>

> *"Craig Feinstein" <cafeinst@msn.com> wrote...*

> > *The argument is as follows. Its very similar to a previous post that I  
> > made which argues that Twin Primes is unprovable. I'll let you judge  
> > whether this is a rigorous proof or not. I'm not claiming that it is  
> > or that it is not – It's just for fun:*

[...]

> > *Therefore, the two conditions which define the two sets are  
> > independent from one another, meaning that the only way to determine  
> > whether the intersection of the two sets, S and T, is nonempty is to  
> > directly calculate the elements in the intersection of S and T, i.e.,  
> > test if there is a q such that q and 2n-q are both prime. But  
> > this would take an infinite amount of time, since one would have to  
> > test this for each natural number n. Therefore, Goldbach's Conjecture  
> > is unprovable. QED*

> *Hi Craig. This sounds similar to your proof idea for  $p \neq np$ . In that proof,  
> if I recall correctly, you claimed (without adequate proof) that a single  
> solution to the problem existed (in that case the problem was subset-sum),  
> and then claimed that this single solution required at least a  
> super-polynomial amount of computation to solve (hence subset-sum must be in  
> NP-P so  $P \neq NP$ ). In this proposition you state:*

>

> *"the only way to determine whether the intersection of the two sets, S and  
> T, is nonempty is to directly calculate the elements in the intersection of  
> S and T"*

>

> *You still need to prove that this truly is 'the only way'.*

There's a more basic flaw in the logic, of course. Craig states that to prove or disprove Goldbach's conjecture would take an infinite amount of time, since you'd have to test every even number greater than 2. But he forgets that *\*if Goldbach's conjecture is false\**, then you only need to test N different integers, where N is a number such that

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$(2*N)+2$  is not the sum of a pair of primes. And if you only have to test a finite number of numbers, well, that certainly shouldn't take an infinite amount of time!

So Craig has shown that \*if\* GC is true, [and \*if\* certain other implicit assumptions about prime numbers hold,] \*then\* GC is unprovable. But he hasn't ruled out the possibility that it might be false --- and if it's false, then it's most definitely provably so!

-Arthur