# Re: Incompleteness vs. Mechanical Reasoning

***Source:*** http://sci.tech−archive.net/Archive/sci.logic/2008−04/msg00315.html


- *From*: "R. Srinivasan" <sradhakr@xxxxxxxxxx>
- *Date*: Sun, 6 Apr 2008 11:14:07 −0700 (PDT)


On Apr 6, 9:05 pm, Aatu Koskensilta <aatu.koskensi...@xxxxxxxxx>
wrote:

> On 2008−04−06, in sci.logic, R. Srinivasan wrote:
>
> > Consider a proposition P about a future contingency that is based on
> > the decision taken by a human being X. A human being has free will if
> > and only if that proposiiton is fundamentally undecidable right now,
> > in the sense that we human beings (including X) cannot ever hope to
> > have a theory (right now) that correctly decides P.
>
> (I presume you don't mean the question of free will hinges on our
> ability to predict a particular choice P). If this is all that is
> meant by our having free will I'm perfectly happy to agree we have
> absolutely and utterly free will. That is, I'm perfectly willing to
> accept that with regards to future contingencies about human decisions
> we can't ever hope to have a theory that, with any practical success,
> predicts what we will or will not decide in all but the most trivial
> cases.
>
> Alas, on this conception it's difficult to see what relevant
> difference there is between computers and humans. For all we know it's
> perfectly possible future computers have free will in this sense. It
> wouldn't be much of a stretch to say they have free will at this very
> moment.

Here is where we differ. I do not agree that the kind of computers
that you have in mind can have free will in this sense. You are
presumably using the classical undecidability of the halting problem
to assert that a computer's future action (e.g. will it halt or not
halt?) could be unpredictable. But this theorem does not apply in
NAFL, in which I have formulated my definition of free will. There are
no non−standard models of arithmetic in NAFL. So the only way to make
the assertion in NAFL that the computer does not halt is via a proof
of that claim, which has to exist (at least in principle, even if we
cannot access that proof right now).

The kind of computers that could possibly have free will in this sense are quantum computers as defined via the NAFL model of computation (still in its infancy, I will admit). I have a long way to go in this direction. The basic idea is that in NAFL, an infinite step−by−step computation is never completable and is ill−defined. However, if a quantum computer can define a genuinely random number n, then it should also have the ability to access a truly random step n in the computation. In NAFL, this means that as long as we do not take steps to find out (or assert) what n is, it is in a superposition state of all possible values. Effectively, this means that the infinitely many steps in the computation have been carried out in parallel. In fact the claim is that current quantum theory permits infinite parallelism as can be seen from the following reference:

http://arxiv.org/abs/quant−ph/0410141

However, I think this claim may be controversial as it goes beyond "standard" (currently accepted) models of quantum computation.

> At this point you would say "Right now we do have a theory T1 which proves P and another theory T2 which proves ~P and one of these has to correctly predict the truth or falsity of P; but we human beings have no way of predicting which of these is the correct theory". This is exactly equivalent to asserting that "Right now P is either true or false, but we human beings have no way of saying which of these is the case".

> But just what does our having or failing to have free will have to do with claims about future being true or false? On the face of it, it's perfectly compatible with the freeness of my will that it's true that I will, in fact, freely choose to eat an ice−cream cone tomorrow at 10am.

No. This is what I am contesting. If your choice of eating an ice−cream cone tomorrow at 10 AM is made *today*, you can contradict that choice tomorrow at 10 AM by your free will. You can only know the truth or falsity of that proposition at 10 AM tomorrow. That is why it is a choice made out of free will. Your claim that such a truth exists *today* is false by my reckoning (although it mah hold in classical logic) even if you do actually eat an ice−cream cone at 10 am tomorrow. From the NAFL ;point of view, today what holds for that proposition P is a superposed state "P&~P" which basically asserts that you can neither prove nor refute P, say, in your best available theory T. Tomorrow at 10 AM you may have a theory T+P in mind (by virtue of your actually having eaten an ice−cream cone at 10 AM) that

also proves the proposition Q that "P always was true", but the truth of Q itself is temporal and applies only after 10 AM tomorrow. In other words, our knowledge of Q is only retroactive, and does not contradict that what applies *today* is a superposition state P&~P. This has important implications for the interpretation of quantum physics paradoxes, e.g. the Schrodinger cat, as I have already discussed.

Regards, RS
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