

Re: Incompleteness vs. Mechanical Reasoning

Source: <http://sci.tech-archive.net/Archive/sci.logic/2008-04/msg00309.html>

- *From:* "R. Srinivasan" <sradhkr@xxxxxxxxxxx>
 - *Date:* Sun, 6 Apr 2008 08:51:40 -0700 (PDT)
-

On Apr 5, 4:07 pm, Aatu Koskensisilta <aatu.koskensi...@xxxxxxxxxxx> wrote:

On 2008-04-04, in sci.logic, Rupert wrote:

How do you know that we have free will?

Being the predictable scoundrel I am, I would first ask just what it means for us to have or fail to have free will. Isn't philosophy fun!

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 proposition 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. Further P remains similarly undecidable right until that point of time at which X takes the decision (in which case at least X can correctly assert the truth or falsity of P).

At this point you would say "Right now we do have a theory T1 which proves P and another theory T2 which proves \sim 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". And this is exactly what NAFL rejects. The **knowledge** that one of these is the right theory can only come **after** P has been decided by X and not before. Right now, we **cannot** have that knowledge because if we did, X could contradict that outcome out of free will. So **right now** there is no truth for P and in fact from the NAFL point of view, $P \& \sim P$ is the case (meaning basically that we do not have a proof of either P or $\sim P$ in our best possible theory at this point of time). Later on we could discover, e.g., that "T1 was always the correct theory", but this assertion is a temporal truth that only applies **after** our discovery and not before. So there is no contradiction with the earlier conclusion that $P \& \sim P$ is the case, which

Re: Incompleteness vs. Mechanical Reasoning

is meaningful in NAFL as discussed. Note that NAFL is a temporal logic that deals correctly with the time-dependence, which is crucial here.

An analogy with quantum physics is in the Schrodinger cat example. Right now, at time t_0 , the cat is in the sealed box and we cannot possibly have any knowledge of its classically possible state (alive or dead). So quantum physics asserts that right now the cat is in a state of "alive and dead". From the NAFL point of view, the cat's state changes when (and only when) we open the box and find out its state. Until that time the cat remains in a superposed state. This superposed state means in NAFL that we do not have a proof in our best quantum physics theory T that the cat is alive and we do not have a proof in T that the cat is dead. The cat's state changes when and only when we open the box and determine it. Suppose we open the box at time $t_1 > t_0$ and find that the cat is alive. Now classically, one would assert that the cat was always alive, and its state was "alive" even at time t_0 when we could not have known that it was alive. This is contradicted by quantum physics, which asserts that the cat's state was "alive and dead" at t_0 and until that point of time t_1 when "decoherence" occurred by our opening the box and exposing the cat to the environment.

From the NAFL point of view, no "decoherence" occurred when we opened the box. The only thing that happened was that we found out that the cat is alive. In fact one could assert that the cat was always alive, but *at time t_0 * this is a metalogical "reality" which NAFL does not recognize. Even in NAFL, the cat's state was in a superposition state at time t_0 . and this is the only "reality" that exists at time t_0 . The reality that "The cat was always alive, even at time t_0 " can only be asserted by us human beings *after* time t_1 , and so such a reality can be validly concluded retroactively, *after* time t_1 , which does *not* contradict the earlier-concluded superposed state at time t_0 . Here it is crucial to realize that the superposed state expresses a "reality" (from the NAFL point of view) that we humans cannot possibly have any knowledge of the cat's physical state. Since the later discovery that "the cat was always alive" is a temporal truth that applies *after* time t_1 , and the earlier superposed state does *not* mean that the cat was "really" alive-and-dead, there is no contradiction in NAFL (which is a temporal logic).

So what does the Schrodinger cat experiment have to do with free will? From the NAFL point of view, the cat's state changed from "neither alive nor dead" to "alive" (and in fact to "the cat is and was always alive") only because we human beings decided to open the box out of our free will at time t_1 . If we had not done that and if we never ever open the box, the cat's state would forever be "neither alive nor dead" (as expressed by the superposed state) and no reality can ever be concluded for the cat's physical state that is independent of our minds (or equivalently in NAFL, independent of our best physics theories which we have in mind). Or to put it more accurately, any such "reality" will have to be metalogical, i.e., outside the purview

Re: Incompleteness vs. Mechanical Reasoning

of logic, as far as NAFL is concerned.

Regards, RS

.