

Re: How to do magic with infinity

Source: <http://sci.tech-archive.net/Archive/sci.logic/2004-10/1267.html>

From: Frank Piron (*empty_at_zero.nil*)

Date: 10/28/04

Date: Thu, 28 Oct 2004 10:42:57 +0200

Thu, 28 Oct 2004 09:43:06 +0200 Han de Bruijn
<Han.deBruijn@DTO.TUdelft.NL> wrote:

> *I showed the output of the program to my colleagues and everybody agreed
> with me that it is a (big) natural number. Nobody felt the need to say
> that it is just the *picture* of a natural number. If I hadn't shown you
> the program, you wouldn't even have noticed that it's just the printout
> of a random sequence of digits.*

In fact you didn't show me the program because the library function "random" comes from outer space in your listing. For this function there are two origins possible

1)

It is a pseudo random generator and thus an ordinary number function.

2)

It takes some value from the computers hardware which implies that the function which your program computes can not be computed by a Turing Machine.

> *If I had presented you a thousand digits
> of Pi instead, say the 1000'th until the 2000'th digit, you wouldn't
> have noticed the difference between those and my random sequence.*

Yes, but if you would have presented me a *program* which computes the mentioned sequence of Pi digits, i would have said: "well, this is a little deterministic program which is able to compute very large numbers. And these numbers do all exist because i can understand a procedure which generates them."

> *So what are you talking about ? I stay with my point that my output IS
> actually a natural number.*

I agree that your *output* is a natural number. But the point is: i can take your finite output and then produce a completely different program which computes the same number. If your random generator does a good

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job then my different program will have a length nearly the same as your output.

But what about numbers for which no generating programs can be written down?

In what sense do they exist or not exist?

- > *I can write it up. I can define additions and*
- > *multiplications with such numbers. They DO fit into my computer's memory*
- > *(which is BTW part of the universe ! And, please , don't rely on those*
- > *old fashioned & slow computing beasts called Turing machines :-)*

For a discussion like this one the model of computation should not be of relevance.

BTW: Non existing natural numbers are interesting only if the set of non existing natural numbers is not empty :-)

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Frank Piron,
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(leftrotate two)