

# Re: use of real numbers in mathematics and physics

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- *From:* Oz <Oz@xxxxxxxxxxxxxxxxxxxxxxxx>
  - *Date:* Wed, 6 Apr 2005 08:25:31 +0000 (UTC)
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John F <john@xx> writes  
> The Kolmogorov complexity of a string (which may be a  
> sequence of digits) is, simply, the length of the shortest  
> computer program which emits that string. So, for example,  
> pi contains only a little information since a relatively  
> short program can emit it. Of course, it'll take quite  
> a while for that program to finish, and I won't go into  
> space (i.e., memory requirements) versus time (number of  
> instructions executed) complexity.

Perhaps sliding into philosophy as an alternative to mathematically describing precisely what one is saying (due inability to do same):

1) I don't think you can distinguish complexity in a 3+1D world by taking the complexity of the 3D bit (the program) and ignoring the length of the time bit (required to obtain the precise result). I would thus say that pi requires infinite information even if its isn't complex. After all the number 'one' is very simple yet implies and infinite precision. You can't even do pi in analogue form since this would require a known precisely flat space over an extended area, which itself requires similarly infinite precision.

2) I hadn't spotted JB's comment that p & q together define the fuzziness of space, but I like the idea. Its a similar argument to (1) above.

3) About the only thing one seems to be sure about is that particles come in chunks of one since nobody ever measured (say) half an electron. However I don't even think this is really true as all detectors have a finite detection efficiency and particles do have an ability to be elsewhere due tunnelling. It may be here today, but (a low probability) of gone tomorrow. So not-measuring an electron doesn't mean that there isn't one there (or even near).

4) Its agreed that there is no global definition for 'the energy of the universe' and I would bet similar arguments ought to apply to most other constants. How can one be sure, for example, that the observable universe is always uncharged?

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5) One is thus drawn to the conclusion that any 4-volume of space has a maximum information content. From a distant memory of an aged 'This Weeks Finds...' I think this is the information content on the surface of a black hole of equivalent surface (I've probably got this wrong), which is indeed a rather large number. Its rather irritating that this large number does not seem to reflect the size of h.

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Oz

This post is worth absolutely nothing and is probably fallacious.

Use oz@xxxxxxxxxxxxxxxxxxxxxx [ozacoohdb@xxxxxxxxxxxxxxxxxx functions].

BTOPENWORLD address has ceased. DEMON address has ceased.

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