Re: Peano's space−filling curve

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From: John Morgan (*john.morgan_at_atExpungebetweencapSaraxie.fr*)
Date: 07/13/04

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Date: Tue, 13 Jul 2004 17:39:46 +0200
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I've replied to four posts in one to save space and time. No Lorentz transformation required :−))

David C. Ullrich <ullrich@math.okstate.edu> wrote in message news:j5bqe095dkosep86mj40e3ef170kqek1ma@4ax.com...
> On Thu, 8 Jul 2004 12:32:13 +0200, "John Morgan"
> <john.morgan@atExpungebetweencapSaraxie.fr> wrote:
>
> >I meant A = {a1,a2,a3,....} and similarly for A', B and
> >B', where a1,a2,...etc. are the individual elements.
>
> Not sure exactly what you mean by that. The notation
> appears to suggest that A and B are countable, which
> they need not be.

I see from Dan Grubb's post that the correct notation should be A = {a: a\in A}

[...]

> A is a set; that means it has some things that we
> call elements, some > things are elements of A
> and some things are not. That's all you need to know.

I can conceive of this, but then I encounter a new problem. It always seemed to me that the domain of a function and the rule that linked it to the codomain were inextricably linked, with the set comprising the domain determining which rules were applicable, while a given rule might only be relevant to a certain class(es) of sets. If the domain was a set of the names of famous people, then the rule 'has a birthday on' can map the name to a codomain of 366 Julian days, while the rule 'multiply by two' is meaningless. However, its inverse 'multiply by 1/2' is not incompatible with the codomain. Similarly the first mentioned rule is meaningless when applied to a domain of integers while its inverse 'is the birthday of' can be applied to integers, as long as these represent Julian days.

What I see now is a level of abstraction wherein the nature
of the function is made sufficiently general that any and
all sets can be regarded as its domain/codomain. I
probably need to think about this quite a bit.

> >[...]

> >if I take TF1 as true then I have no other problems
> >with following the proof and finding it makes sense −
> >which is all that this scientist needs :−)
>
> It's hard for me to see how you could do the rest of it
> if you're unable to do TF1.

I just_assumed_TF1 was correct and continued just as though
I had_proved_it correct. See below.

> But there are lots of things I don't understand.

I know the feeling :−))

Daniel Grubb <grubb@lola.math.niu.edu> wrote in message
news:ccjmrp$it9$1@news.math.niu.edu...
>
>Questions involving functions between sets
*> only involve the sets *as sets*. If there are orders on*
> the , we can also talk about 'order preserving functions'
> and if there are topologies on the sets we can talk about
> 'continuous functions', but a general function doesn't
> have to be either of those.

[...]

> AxB={(x,y): x\in A, and y\in B}.
>
> Still good?

A OK

> Now, for RxR, we usually imagine the plane, since
> Descartes showed how to identify the plane with
> ordered pairs of real numbers. But, we don't have a
> notion of closeness when we are dealing with sets.
> Each point of the plane is regarded as separate from
> every other. No closer or farther away.

I have difficulty with 'separate' applied to ordered reals.
That would seem to me to invest them with the property of
countability which I know they don't have. I seem to see in
Cantor's diagonal argument that no amount of separation
would ever, ultimately, allow the reals to be listed in

order and that they are therefore inseparable.
>
David C. Ullrich <ullrich@math.okstate.edu> wrote in message
news:1m5re0pu82r8r7qnlkckvpcgkinp1h12pn@4ax.com...
> On 8 Jul 2004 14:48:25 GMT, grubb@lola.math.niu.edu
(Daniel Grubb)

> Under the circumstances it probably would be better not
> to corrupt the notation.

Not to worry, I was able to read beyond it.

I had more or less got to F((a,b)) = (f(a),g(b)) = (a',b')
because there was really nowhere else to go! I was still
unhappy that this ignored what elements were in A and B and
also what kind of functions F, f and g were. I'm probably
too old for this kind of mathematics :−(

> >....need more than the hints I was giving.

> >.....he had got it himself he would have attained
> >a deeper understanding.

In fact I seem to be striving for a depth of understanding
that is not actually required :−(

Daniel Grubb <grubb@lola.math.niu.edu> wrote in message
news:cck69qkfp1@news.math.niu.edu...

> I thought a nudge would do him good. He still has to show
> that the new function is a one−to−one correspondence, so
> there's plenty of chances to learn. :)

I think it is because f−1(a') = a and g−1(b') = b then
F−1((a',b')) = (f−1(a'),g−1(b')) = (a,b) so the existence of
an inverse function implies a 1−to−1 correspondence for F.

For the rest of the proof of TF4 I X I = I, I simply noted
that TF1 AxB ~ A'xB' taken with TF3 D ~ I gives TF5 DxD ~ I
x I, TF2 DxD ~ D taken with TF3 D ~ I gives TF6 DxD ~ I and
these two new TFs together give the desired result I x I ~ I

Cheers,

John