Re: Two results of set geometry

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- *From*: David R Tribble <david@xxxxxxxxxxx>
- *Date*: Mon, 29 Oct 2007 17:07:29 −0700

Tony Orlow wrote:

> Does an infinitesimal square have edges?

David R Tribble wrote:

> I guess that depends on what an "infinitesimal square"
> is, doesn't it? Is that a square that's as small as a
> point? Smaller? Can an edge be as small as a point?

Tony Orlow wrote:

> A point might be considered a square of size 0, really being four points
> in the same location, but I mean a square with an infinitesimal nonzero
> side.

So we're not talking about a square composed of real points,
then, are we? Since infinitesimals don't exist in real (R^n)
space, can we go ahead and say that infinitesimal squares
do not exist in real space either?

Tony Orlow wrote:

> Now, zoom infinitely out, so that you can actually see the square,
> such that it appears to be one unit in size.

David R Tribble wrote:

> How is that done? If it's infinite in extent, there is no vantage point from which it doesn't look infinite in both directions. Are you saying it's not really infinitely wide?

Tony Orlow wrote:

> Sure it is, but you are at an infinite distance, and therefore it's all viewable.

David R Tribble wrote:

> It's all viewable from any *finite* distance, obviously. Every point on the plane − sorry, square − is a finite distance from the viewpoint. (Kinda like every natural in N is finite, huh?)

Tony Orlow wrote:

> Um, no. I am not talking about some countably transfinite square, ...

I don't know what a "countably transfinite square is".

> ... but an uncountably large one, when measured in finite units. You will not be able to detect the edges from any finite distance.

An infinite square has edges?

David R Tribble wrote:

> What makes you think any finite point would be visible from an infinite distance? You seem to be contradicting things you've said previously about things on the "finite level" and the "infinite level".

Tony Orlow wrote:

> I don't think so. I never said that you could distinguish any finite portion of the square from an infinite distance, but that you could view the entire infinite object, corners, edges and all.

What edges? What corners? We are talking about a geometric object in real space of infinite extent, are we not?

David R Tribble wrote:

> Using your own logic,
> there is no point in the square that's infinitely far from the center (just like there's no natural in N infinitely greater than zero).

Tony Orlow wrote:

> I never said that. You don't understand what I'm saying because you're reading your own conceptions into it. A countably infinite square, or circle, or any geometrical object, simply doesn't make sense. Edges are missing in that case. But an uncountably infinite object may very well have well defined features.

I don't know what you mean by "countably infinite geoemtrical object", or how it's supposed to differ from an "uncountably infinite geometric object". Are you talking about the cardinality of topological objects?

Can you prove that an "uncountably infinite geometric object" does indeed have "well−defined features" such as edges?

> That's what I'm talking about. Edges that are infinitely distant from each other.

How can that be? An edge means the end of something, a boundary between the object and outside the object. Where is outside an "infinite square"?

David R Tribble wrote:

> All the points in the square are
> finitely distant from the center, so why would you see
> any of them at an angle greater than 0 from an
> infinite viewpoint?

I wouldn't, if that were what I were talking about.

Are you talking about an "infinite square" or something else?

David R Tribble wrote:

> And what about the center of the infinite square?

Tony Orlow wrote:

> What about it?

David R Tribble wrote:

> Where is it? Halfway between the infinite edges?

Tony Orlow wrote:

> Yes.

David R Tribble wrote:

> Can I see the point that's halfway between the center
> and the right edge? Is that the point at BigUn/2
> (or maybe BigUn/4, I'm losing track) that's a finite
> distance from the center (because all the points in
> my square are a finite distance from the center)?

> I forget, is BigUn/2 a finite number or not?

Tony Orlow wrote:

> > No, Big'Un is uncountably large, which is why it's the length of the side of the square. It's an uncountably large square.

So all the points in this "infinite square" are not a finite distance from the center of the square? As I travel from the center of the square, counting points that are finite distances from the center, at what boundary do I magically cross over into counting points that are not finitelt distant from the center? Can I tell when I'm halfway to that boundary?

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