Re: Cantor Confusion

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- *From*: "Dik T. Winter" <Dik.Winter@xxxxxx>
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In article <1162405329.073198.286680@xxxxxxxxxxxxxxxxxxxxxxxxxxx>
mueckenh@xxxxxxxxxxxxxxxxx writes:

> Dik T. Winter schrieb:

....

> > > Irrational numbers have no last digit. Therefore, with a sequence of
> > > digits like the diagonal number is, one can never have a completed
> > > number but only come as close as possible to any number −−− or avoid to
> > > do so.

> The problem is that:
> For the diagonal number of Cantor's list it is not sufficient to come
> arbitrarily close to a number which is different from any list number
> −−− or avoid to do so. .

You lost me here. Numbers do not come arbitrarily close to each other.
Numbers are fixed entities. Sequences can come arbitrarily close to
each other.

> > > Not so. Of course we talk about a fixed base like 10.
> >
> > Ah. In that case one or two, depending on the number involved. But
> > the diagonal obviously depends on the actual representative chosen.

> So we have no arbitrary choice but , in case of irrational numbers,
> exactly one representation. And this representation is *the limit* of
> all the sequences of the due equivalence class.

You are pretty wrong here. There are a lot of rational numbers for which
there is only one representative in decimals. And, representatives are
not limits. When considering the equivalence classes, most sequences
have one limit: the equivalence class it is sitting in.

I think that you are still thinking that *some* represenation defines a real number; but that is not the case. That is especially not the case when you consider only representations to some integral base. There are other methods to define numbers. You do not like to call them numbers, but ideas. But you can not prevent me to call something like sqrt(2) a (real) number. And in common mathematics that is just what it is.

By definition, every sequence (use any definition, I know Cantor, Dedekind, Baudet and Weierstrass, they all lead to the same):
{sum{k = 1...n} a_k/10^k}
is a representative of a "number". It is just a sequence of rationals.
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