Re: Is magnitude more fundamental than the real numbers?

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- *From*: "Dik T. Winter" <Dik.Winter@xxxxxx>
- *Date*: Wed, 9 Aug 2006 00:10:30 GMT

In article <1155061899.245391.199990@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx> "Timothy Golden BandTechnology.com" <tttpppggg@xxxxxxxxx> writes:

> Dik T. Winter wrote:

....

>> The "identity axis" is nothing new at all. It is well known that when you multiply a number by a zero divisor that the result is a zero divisor. And that is what your "identity axis" states, the only point is that there is not a single "identity axis", there are multiple.

....

> There is only one of these axes. It acts like a real line embedded in the even signed P4+ domains. It always has the notation (1, 0, 1, 0, ...).

No, there are more of them.

> The term 'zero divisor' is one that I am not yet comfortable with, but it is fairly easy to see that in the reals
> (0) (+5) = 0 .

Yup. But a zero−divisor is a *non−zero* number that can be multiplied by another non−zero number to give 0. So when a and b are non−zero and a.b = 0, a and b are both zero divisors.

> This does not make any strong statement about the number +5, just as the example in P4
> (# 1 + 1) (# 1 * 1) = 0 .
> does not make a strong statement about (# 1 * 1).

But (#1 + 1) is non−zero, so it makes a strong statement. Anyhow, you
will not find a solution to:
(#1 *1 +1)/(#1 *1)
because the first is not a zero−divisor and the second is.

In P4 there are numerous zero−divisors, some basic ones are the following
six (coordinates in order #, *, +, −):
(1, 1, 0, 0) (1, 0, 1, 0) (1, 0, 0, 1) (0, 1, 1, 0) (0, 1, 0, 1) (0, 0, 1, 1)
for *all* six of them you can not find a quotient if you try to divide
(1, 1, 1, 0) by any one of them.

> Also, you've neglected the tail portion of my statement that makes a
> fairly strong argument, particularly the analysis of
> z (# 1 + 1) = c
> for constant c. There is perhaps a misunderstanding.

But z (1, 1, 0, 0) is also on some axis (a different one).
Some linear algebra: to solve
(a1, a2, a3, a4)/(b1, b2, b3, b4) = (p1, p2, p3, p4)
you get at the matrix
(b1 b2 b3 b4)
(b4 b1 b2 b3)
(b3 b4 b1 b2)
(b2 b3 b4 b1)
we are interested in the determinant, because if it is zero there is in
general no solution. The determinant is zero if either b1+b2+b3+b4 = 0
or b1−b2+b3−b4 = 0. It is however a bit more tricky as we are in
equivalence classes where incrementing each coordinate by the same value
does not change the number: (1, 1, 1, 1) = 0. But whatever increment
we use, the determinant remains zero if b1−b2+b3−b4 = 0. So we can never
find a generic solution for (1, 1, 0, 0), (0, 1, 1, 0), (0, 0, 1, 1) and
(1, 0, 0, 1) (or in general for (b1, b2, b3, b4) if b1−b2+b3−b4 = 0).
And, indeed, if b1−b2+b3=b4 = 0, (b1, b2, b3, b4) is a zero−divisor.
In that case: (b1,b2,b3,b4)(1,0,1,0) = (b1,b2,b3,b4)(0,1,0,1) = 0.
You are only seeing that (1, 0, 1, 0) and (0, 1, 0, 1) can only divide
(a1, a2, a3, a4) if a1 = a3 and a2 = a4.

> The identity axis is a dominant feature of the even signs. as is
> demonstrated by

Sorry those pictures do not tell me anything.

> Is this perhaps a counterexample to your claims above?:
> (# 1 + 1)(# 1 + 1) = # 2 + 2 ;

I see no counterexamples. Try to divide (1, 1, 1, 0) by (5, 3, 1, 3) and
see that it fails. More knowledge about zero−divisors would help you.
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