Re: Polysign Quotients

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Timothy Golden BandTechnology.com wrote:

> Dik T. Winter wrote:
>
>> In article <1155123799.250626.317520@xxxxxxxxxxxxxxxxxxxxxxxxxxx>
>> "Timothy Golden BandTechnology.com" <tttpppggg@xxxxxxxxx> writes:
>> ...
>> > I believe that I have resolved our apparent disagreement. I've
>> > scrambled together a low grade reciprocal finder (results with large
>> > error) and sure enough the divisor counterexamples that you provide
>> > have no decent reciprocal. I've read the definition of zero divisor and
>> > it is fine though it does not discuss anything about the underlying
>> > structure of the system it is applied to. I suppose that is up to us
>> > and I am now curious what we'll see above p4 in this context.
>>
>> Zero−divisors are indeed pat of the structure, but much can be said
>> about zero−divisors without even investigating the underlying
>> structure (when that is a ring, of course).
>>
>> > The 'other axes' are actually a plane. It is the plane that is
>> > perpendicular to the identity axis that passes through the origin.
>>
>> Yup, the set of obvious zero−divisors are, using coordinates
>> (x1, x2, x3, x4), the plane x1 + x3 = x2 + x4 and the line
>> x1 = x3 & x2 = x4.
>>
>> > We've discussed it a bit before but now I can see it in the context of
>> > division. Just as a multiplication by a point on the identity axis
>> > removes information so does a multiplication by any point in this
>> > plane. Instead of squashing the information into a line it yields two
>> > dimensions of result, but still provides an irreversible effect on any
>> > object. In effect the object has been squashed into a plane and can
>> > never be 'unsquashed' informationally.
>>
>> Indeed, the product of a zero−divisor and an arbitrary element is a
>> zero−divisor. That is easy to prove when the product is commutative.
>>
>> > We cannot
>> > get three dimensions back from two. There must be a theorem on

> dimensional reduction and zero divisors. It's clear in the
> informational context.

There is not necessarily dimensional reduction. There are rings where every element is a zero−divisor. But in general the zero−divisors form subspaces of lower dimensionality (assuming we have some dimensional algebra over the reals, which you have). But it is all quite tricky, because if a and b are zero−divisors, a + b is not necessarily a zero−divisor.

Also it can be said that if a and b are zero divisors then their product is not necesarily zero.
For instance −1*1 and #1+1 are both zero divisors. But their product is −2*2.
This is where the structure matters, for it can be said that iff a is on the 1D part and b is on the 2D part that their product will be zero. This is all in the P4 context. The 1D part forces a result on its axis and the 2D part forces a result on its plane, yielding the origin. The two are inherently tied together. I think that this dimensional level is more appropriate a focus than the phrase 'zero divisor' for this phrase connotes a general phenomenon but without the structure it is too abstract. Each zero divisor loses its meaning without being attributed to its place in the structure. For P4 this is an axis and its orthogonal plane at the origin.
In P6 the value (0,0,1,1,0,0) does not intuit to be normal to (1,0,1,0,1,0) but it is according to my computer a right angle. So thus far the zero divisor concept laid out here maintains an orthogonal relation in P6 as well. In P6 the space orthogonal to the identity axis is a 4D object. But this is just pinning down a known behavior. The P5 challenge sounds much more interesting since there is a sliver of hope of proving an exception to Hopf.

You will not find an exception to a theorem.

[snip]

I still have not found the Hopf proof. Since you have carefully noted its publication I'll see what can be gotten in english.

You can look for similar arguments in Husemoller's "Fiber Bundles", if I recall c0orrectly.

Hopf's theorem, as well as Milnor−Kervaire's and others in this direction are *not* proved using algebra, but algebraic topology.
The topological arguments stem from a rather deep study of

what spheres can be given the structure of H−spaces (see
wikipedia por a definition) and similar ideas.

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