Re: Geometric Algebra

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From: Igor Khavkine (*igor.kh_at_gmail.com*)
Date: 03/02/05

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On Thu, 24 Feb 2005 22:47:20 +0000, Aaron Denney wrote:
> On 2005−02−23, Igor Khavkine <igor.kh@gmail.com> wrote:

>> I had a brief interest in geometric algebra when I stumbled upon
>> Hestenes's books. I can't say that I was particularly satisfied with the
>> introduction of the geometric algebra notation. Although, it does
>> simplify some calculations and gives you the power of quaternion
>> treatment of rotations for free. But that also means that you are out of
>> luck if you want to work in a other than 3+1 space+time.
>
> How so? Doesn't the bivvectors as rotations connection work fine in any
> number of dimensions? The quaternions are nicely embeddable inside
> appropriate Clifford algebras, and they are a nice representation of three
> and four−dimensional rotations, but that doesn't mean that Clifford
> algebras don't have nice reps of rotations that aren't equivalent to the
> quaternions −− in fact I find that explaining why the quaternions are a
> nice representation is most easily done via Clifford algebras' nice
> representations.

You are right, bivectors basically correspond to Lie algebra elements of the rotation group, in any number of rotations. I am less familiar with Clifford algebras in general, but what you echoes what I've heard before. However, the great thing about three spacial dimensions is that the algebra of bivectors turns into a division algebra −− the quaternions. This happy circumstance introduces extra niceness into the calculational framework. Unfortunately, this extra niceness goes away in higher dimensions.

Igor