Re: Simple books on 4−vectors

Source: http://sci.tech−archive.net/Archive/sci.physics.research/2004−10/0157.html

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Date: 10/11/04

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Date: Mon, 11 Oct 2004 08:52:34 +0000 (UTC)
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Danny Ross Lunsford <antimatter33@yahoo.com> writes

>I assume you are familiar with the notion of a vector. Let's defer the
>precise definition until later. It's a "directed length" − which
>means, it has a direction and a length. Let's call it an "oriented
>length" − oriented because you pick the direction from one endpoint to
>the other. Let's call it
>
>X

OK.
As a detail, can we not say that in principle we can express this object
as being in any number of dimensions by re−orienting any arbitrary set
of axes so one 'points' in the direction of X. In this case X can be
expressed as two numbers, 'start' and 'end' on some number line. We note
that

end − start = − (start − end)

Direction in this case is either + or − so is a 0D dimension.

>Now we can consider objects which depend on 2 directed
>lengths. They mark out a parallelogram in space − which is nothing but
>an "oriented surface element" − oriented because we can pick one
>length as the "start" and the other as the "finish". Let's call it
>
>X ^ Y

Oooh. Trickier.

>The magnitude of X ^ Y is just the area of the parallelogram.

Hang on. You haven't defined 'area'.
It certainly isn't typically a linear combination of X & Y.

>Y ^ X

Yes, nice one!

>and we express "oppositeness" by the rule: Y ^ X = − X ^ Y

>Now suppose X and Y are the same oriented length X = Y. The
>parallelogram collapses to a line segment and the area is 0. That is,
>
>X ^ Y = 0 if X = Y

Yes, but hang on. What you are really saying ix X ^ X = 0
Ahh, hang on, you are saying nX ^ X = 0, n any real number.

Ahh, but we should be able to define an orthogonal axis this way.
Hmm, needs some thought though.

>Next is an "oriented space element" − three directed lengths in a
>specific order. It is
>
>X ^ Z ^ Y = − X ^ Y ^ Z = + Y ^ X ^ Z = − Y ^ Z ^ X = + Z ^ Y ^ X
>= − Z ^ X ^ Y
>
>and so on. So we have a hierarchy of objects
>
>X
>X ^ Y
>X ^ Y ^ Z
>X1 ^ X2 ... ^ Xn
>
>They all represent "primitive oriented space elements".
>
>Note that we have to stop inventing new ones when we run out of
>dimensions. This is expressed by the rule
>
>X1 ^ X2 ... ^ Xn = 0 if n > d

OK.

>When you grok this, reply and we'll go into more depth. The thing we
>are considering goes by the ten−dollar name of "Grassmann algebra of
>multivectors". Today we call them "p−forms".

Ohh, scary stuff.....

but GREAT!
Ready for lesson #2 if you have the time.

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−−
Oz
This post is worth absolutely nothing and is probably fallacious.
Use oz@farmeroz.port995.com [ozacoohdb@despammed.com functions].
BTOPENWORLD address has ceased.       DEMON address has ceased.
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