Re: resolve to perpendicular components, because they are independent

Source: http://sci.tech−archive.net/Archive/sci.physics/2006−01/msg02506.html

- *From*: "Ken S. Tucker" <dynamics@xxxxxxxxxxxx>
- *Date*: 22 Jan 2006 16:57:01 −0800

FrediFizzx wrote:
> "Ken S. Tucker" <dynamics@xxxxxxxxxxxx> wrote in message
> news:1137921340.012633.216030@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
> | Hi Fred
> |
> | FrediFizzx wrote:
> | > "Ken S. Tucker" <dynamics@xxxxxxxxxxxx> wrote in message
> | > news:1137871786.842707.317150@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
> | > |
> | > | FrediFizzx wrote:
> | > | > "Ken S. Tucker" <dynamics@xxxxxxxxxxxx> wrote in message
> | > | > news:1137804799.742330.45120@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
> | > | > |
> | > | > | FrediFizzx wrote:
> | > | > | > "Ken S. Tucker" <dynamics@xxxxxxxxxxxx> wrote in message
> | > | > | > news:1137800854.404588.75250@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
> | > | > | > |
> | > | > | > | Timo Nieminen wrote:
> | > | > | > | > On Fri, 20 Jan 2006, Ken S. Tucker wrote:
> | > | > | > | >
> | > | > | > | > > I find nonorthogonal axes easier than orthogonal,
> | > | > | > | >
> | > | > | > | > Then you must be some kind of bizarre freak of nature!!!
> | > | > | > | |
> | > | > | > | Not really, as in Chess, solving problems in mathematical
> | > | > | > | physics consists of keeping your options open, to be
> | > | > | > | closed by physical principle, and certainly not by an
> aprior
> | > | > | > | preceived convenience. It's well known "orthogonality" is
> | > | > | > | at best an approximation in a g−field, but Reimann and his
> | > | > | > | "gang" evolved quite a nice "tensor" analysis notation
> that
> | > | > | > | is easier to use than clunky "ijk" unit vectors.
> | > | > | > |
> | > | > | > | > indeed a Curl
> | > | > | > | > becomes A_u,v − A_v,u (== &A_u/&x^v − &A_v/&x^u),
> because

> | > | > | > | > > manipulating equations in tensors is streamlined by
> | > notation.
> | > | > | > | >
> | > | > | > | > Can't you just do that with orthogonal metrics too?
> (Mixing
> | > | > | > covariant and
> | > | > | > | > contravariant is just a naughty little trick to hide the
> | > metric
> | > | > | > tensor!)
> | > | > | > |
> | > | > | > | If your intrinsic dimensionality differs from an integer,
> i.e
> | > | > | > | let n= intrinsic dimensionality =2.9, then how the heck do
>
> | > | > | > | you expect to squeeze 3 orthogonals into that?
> | > | > | >
> | > | > | > Hmm... I wonder if that would apply to what Lisa Randall is
> | > calling
> | > | > | > "Warped Passages"?
> | > | > | >
> | > | > | LOL, ok, how about a link, Randall is super−pop, so
> | > | > | I know you're not jokin...
> | > | > >
> | > | > "Discretizing Gravity in Warped Spacetime"
> | > | > http://www.arxiv.org/abs/hep−th/0507102
> | > | >
> | > | > I haven't read this yet but maybe it has something. I was
> mainly
> | > | > referring to something she was saying in her new book (did you
> get
> | > it
> | > | > yet? ;−)). I didn't make the connection at the time I was
> reading
> | > it
> | > | > until you brought this up (forgot what you call it) again.
> | > | > FrediFizzx
> | > |
> | > | Here's an interesting quicky...
> | > |
> | > | http://en.wikipedia.org/wiki/Fractional_calculus
> | > |
> | > | that demo's a departure from our usual "integer" thinking, we
> | > | commonly apply to both calculus and so to dimensionality.
> | > |
> | > | Recall that when we integrate a line like "x" by
> | > |
> | > | $ x dx = x^2/2 == area
> | > |
> | > | we go from 1D "x" to 2D "x^2" , but what the link above shows
> | > | is that integration (and differentiation) can be a continuous
> thing,

> | > | and so can dimensionality.
> | > |
> | > | Is that where we're going?
> | >
> | > Yep, I am really thinking that this is what she is talking about
> with
> | > "warped" spacetime. Now what is that particular name you had for
> this?
> |
> | I refer to that as "partial interdimensional transformations",
> | basically lifting the requirement for an integer in the tensor
> | indices.
>
> Ok thanks. Maybe we can call this PIT? ;−) As a way to remember it.

Ok with PIT.

> | Recall that conventionally a spacetime tensor would
> | have components like A_u == A_0, A_1, A_2, A_3 , but
> | when we do the tensor calculus the number u=4 is not
> | required until we substitute a 4D CS into a specific
> | physical application.
> | We also know that the "nonorthogonality" (warp) of spacetime
> | depends on the strength of the g−field.
> | An example is the hypothetical "event horizon" where both
> | time and 1 spatial dimension vanish altogether in that extreme
> | circumstance.
>
> Sure. I think Randall is applying the warp factor to a 5th dimension.
> However she is using branes that are separated. I wonder if what she is
> doing would work with the branes intersecting somewhat? IOW, the 5th
> dimension "distance" instead of a separation distance would be an
> intersection distance.

It's reasonable to consider 5D, just look around your office and
see that your desk is denser than the air above it, so far so good.
OTOH, the density of the desk may be described by a 4D warp.
Some physicists perfer to impose a 5th D variable on an orthogonal
4D, but then that becomes a nonorthogonal 4D, as in GR.

> | >From the point of view of experimental mathematics there
> | is a physical basis to consider fractional dimensionality just
> | as we may consider,
> |
> | http://en.wikipedia.org/wiki/Fractional_calculus
> |
> | to show fractional derivatives and integrals is rational
> | mathematics.
> |
> | So if we start with some vector (or tensor) "A" we can
> | manipulate the components "A_n" without specifing n

> | to be an integer. But why would we want to?
>
> Do you mean; why would we want to specify an integer? If so, I would
> imagine that it makes calculations easier? ;−)

> | My reasoning is based on a sort of General Covariance,
> | where the laws of nature are independent of preconceived
> | dimensionality. If I was an electron, the laws of nature
> | would apply to me, but I would not need a wrist watch,
> | because an electron is totally stable in time, and wouldn't
> | work :−).
> |
> | Suppose for example we have preconceived laws of nature
> | cast in 4D and find difficulties of applying GR inside a sub−
> | atomic particle. Would we dismiss GR or question the idea
> | that our macroscopic 4D view of dimensionality is true at all
> | scales?
> | So formulating the laws of physics independent of fixed
> | dimensionality is reasonable.
>
> Hmm... I thought that using tensors already took care of that. So you
> are saying that using integer indices in tensor notation doesn't really
> "match" nature? I guess it is due to the fact that we are imposing a
> Lorentzian signature.

I would say the imposition of the Lorentz signature is required
by specializating a spacetime co−ordinated measure that is
fundamental to coordinating experiments, but not necessarily
the required dimensionality to express the physics laws in.

> FrediFizzx
>
> http://www.vacuum−physics.com/QVC/quantum_vacuum_charge.pdf
> or postscript
> http://www.vacuum−physics.com/QVC/quantum_vacuum_charge.ps
>
> http://www.vacuum−physics.com

Best Regards
Ken

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- ***Follow−Ups***:
  - ♦ ***Re: resolve to perpendicular components, because they are independent***
    - ◊ *From:* Hero . van . Jindelt

- ***References***:

- ***resolve to perpendicular components, because they are independent***
  - ◊ *From:* kenneth . bull
- ***Re: resolve to perpendicular components, because they are independent***
  - ◊ *From:* Ken S. Tucker
- ***Re: resolve to perpendicular components, because they are independent***
  - ◊ *From:* mmeron
- ***Re: resolve to perpendicular components, because they are independent***
  - ◊ *From:* Ken S. Tucker
- ***Re: resolve to perpendicular components, because they are independent***
  - ◊ *From:* Timo Nieminen
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- Next by Date: ***Re: Nutcases have destroyed this newsgroup***
- Previous by thread: ***Re: resolve to perpendicular components, because they are independent***
- Next by thread: ***Re: resolve to perpendicular components, because they are independent***
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