Re: Test2 SPF

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- *From*: "Ken S. Tucker" <dynamics@xxxxxxxxxxxx>
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Hi Rich and Guys.
I think this is a three cent article :−).

On Oct 9, 12:15 am, "Rich L." <ralivings...@xxxxxxxxxxxxx> wrote:

> My two cents on this issue:
>
> I consider math to be a tool with which we construct models of the real world. Mathematics is an incredibly rich subject, with mathematics that describe things that most likely don't exist (e.g. 57 dimensional spaces, spaces with a −1, −1, 1, 1 metric, etc.). Doing math without testing it against reality is just as bad as trying to do physics without math. I've always worked hard to relate the mathematics to the physics, although the more advanced I've gotten in physics the more difficult this has been.
>
> I recall two clear experiences that confirmed for me the importance of maintaining contact between the math and the physics. In one case an undergraduate Electromagnetism professor was calculating the scattering of light by a free charge. Because of an algebraic error he came up with an expression that gave the polarization of the scattered light as being in line with the poynting vector of the incident wave, rather than perpendicular to it. Even when I pointed out this unphysical result the professor maintained that I was wrong. He had lost the connection between the math and the physics.
>
> Another case was a classical mechanics class teaching variational calculus. The simple problem of the shortest path between two points on a sphere was being calculated. At one point an approximation was made. If you related that approximation back to the original problem, you were approximating the sphere to be a circular cylinder. While in fact this approximation still gives a valid result (if the two points are not too far away on the sphere), it should give one pause to wonder exactly what problem was actually solved.
>
> In the case of the Lorentz transformations, there is great difficulty relating our ordinary experience with the implications of the Lorentz transform. The discussion cited earlier I think is a very good example. It is difficult enough to get our minds around length

> contractions and time dilations. When you deal with a series of boosts in different directions, and rotating frames, our physical intuition fails us. The mathematics then is essential to appreciating the more subtle implications of the physical theory. In this case it yields an understanding of the Larmour precession and gyromagnetic ratio of the electron. The mathematics is not nonsense in this case, but it is very difficult to relate to the physical effects it predicts. Part of the problem is jargon, and part is that there is rarely an attempt to show the physical significance of the mathematical ideas.
>
> The problem is that mathematicians (and mathematical physicists) tend to get wrapped up in the math and loose touch with the physics, like my electromagnetism professor. On the other hand a physicist that cannot work with the math, or worse is ignorant of the mathematical theory, is likely to make equally absurd predictions. What is really needed is a cultural (and educational) emphasis on always making the connection between the two. This is what I see lacking in modern physics. Of course the real difficulty is that the connection is difficult to make. I have been working at it, off and on, for 30 years now, with not very spectacular results. What really bothers me is that so many practicing physicists seem to have given up even making the attempt. I've lost count of all the books on general relativity I've read that start out with theorems about vectors, covectors, formal definitions of metrics and 1forms, 2forms, etc. etc. This mathematical theory is clearly all good stuff, but what is missing is how to relate it to the physics. I got so frustrated with this sort of thing during my first try at graduate school in the 1970's that I ended up dropping out. Based on the text books I've seen since then I don't think the situation has changed that much. I suspect that it would be much better if modern physics (I'm thinking primarily of quantum mechanics and general relativity) would be taught with alternating physical and mathematical arguments, so the student could gradually develop a physical understanding about how all these mathematical objects relate to the real world.
> Rich L.

Of course I agree.
I compare using math and physics to walking,
with one foot being math and the other physics.
Walking from A to B, using one leg is hopping,
you'll look a bit funny on the way to a grocery
store, and it's a definite liability in an ass−kickin'
contest, if you have only one leg.

In this article, (see the sample using Hi & Lois),
http://physics.trak4.com/MST_UFT.pdf
I tried to inject an ancedotal connection to relate
power to the metric. Did I succeed?

If so, I can suggest your 60 Watt light bulb is emitting quantized power in the form of photons and then generalize that power "W_00" is quantized.

The meaning of quantizing W_00 means the differential d(W_00) =0 , since NO continous function of power is possible, however power can vary incrementally so we can use /\W_00 , (/\ is the finite increment Delta).

The next problem is the equation, /\g_00 = − /\W_00, that requires the quantization of the metric g_00. (that's why the article ends with a comma).

Sometimes producing (defining) a question is as important as a solution.
For example, do we need a new calculus basing GR entirely on increments, and dismiss the continuum?

I'm tending to think that way, especially in view of the Quantum Theory, but with conditions.
For example consider velocity, dx/dt, it's quantized only for light c=1=dx/dt locally.
So then the conditions of quantization (the use of the increment) needs to be reasoned out logically.
Regards
Ken S. Tucker
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