Re: Principle of equivalence

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- *From*: The Ghost In The Machine <ewill@xxxxxxxxxxxxxxxxxxxxxxxx>
- *Date*: Thu, 17 Apr 2008 23:19:30 −0700

In sci.physics.relativity, rbwinn
<rbwinn3@xxxxxxxx>
wrote
on Tue, 15 Apr 2008 20:55:23 −0700 (PDT)
<a05cbec9−6ad2−4f0e−a2c6−c2ca3815b00b@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx>:

> The basic problem with current interpretation of relativity can be
> seen from considering two frames of reference S and S' and how they
> relate to the principle of equivalence.
> S is a set of coordinates at rest and S' is a set of coordinates in
> motion in the x direction relative to S with a velocity of v. Let S'
> represent a train car in which we will drop a cesium clock at t'=t=0
> from the roof. In S we construct an apparatus on a floor level with
> the train car floor at x=0 from which we will drop an identical cesium
> clock from a height equal to the height of the train car roof.
> Now the train car comes by at velocity v and at t'=t=0 both
> cesium clocks are dropped. If we measure the time on the cesium clock
> in S when it hits the floor, scientists tell us that the cesium clock
> in S' will still be in the air at the time the S clock hits and will
> register a time of
> t'=(t−vx/c^2)gamma at that moment. Scientists tell us that the
> experiment comes out the same in S and S' because when the S' clock
> does hit, it registers the same time that the S clock registered when
> it hit. Then if you looked at the experiment from the frame of
> reference of the train car, the S' clock would hit first, and the S
> clock would still be in the air and would register less time than the
> S' clock.
> Now we look at the experiment from the perspective of Galileo,
> who discovered the principle of equivalence. We will make one change
> in the experiment. When the S' clock is released at the roof of the
> train it will be sent opposite the direction of the motion of the
> train with a speed relative to S' that is equal to the speed of the
> train. The clock will therefore drop straight down relative to S,
> falling alongside the clock in S. According to Galileo, both clocks
> will hit the floor at the same time, and both will read t'=t.
> The Lorentz equations disagree with this. There are two events for
> the S' clock. It is released at t'=t=0, and it hits at x=0 at a time
> of t'2. According to the Lorentz equations, the clock hits at x=0 at
> a time of

> t'2=(t−v(0)/c^2)gamma =t gamma. The Lorentz equations show the S' clock still in the air when the S clock hits even though it is falling right beside it, and Galileo sees the two clocks hit the floor at the same time.
> Scientists say, If this is a problem, it is just a tiny problem.
> Well, if you are figuring times and distances in millions of miles such as trying to land a Mars probe, you might have problems.
> Did anyone notice any problems with Mars probe landings?
> Fortunately for us, Galileo had some transformation equations that explain this phenomenon.
>
> x'=x−vt
> y'=y
> z'=z
> t'=t
>
> Now with regard to cesium clocks, scientists tell us that a cesium clock in S' will show light to be traveling at c=300,000 km/sec the same as a cesium clock in S. How does this relate to Galileo's equations shown above?
> You will notice that the equation shows t'=t. That means that a cesium clock in S' cannot be called t' because t' is already defined to be t'=t. A clock sitting on the floor in S at x=0 shows t'. The time on a cesium clock in S' has to be shown by another variable, n'.

So n' != t'? What is n, the counterpart to n' in the non−prime reference frame? How does it relate to t'? You've given a function below relating n' in terms of t, which is a start.

> If light is traveling at c,

Not proven to some.

> x=ct
> x'=cn'
>
> x'=x−vt
> cn'=ct−vt
> n'=t(1−v/c)

If you're going to define a transformation T(v)(P) that is usable in the physical realm, you'd better have inverse(T(v)) = T(−v) or things get ridiculous.

We have the transform:

$x' = x - vt$
$t' = t$
$n' = t(1 - v/c)$

We now ask the logical question as to how n relates to t'.
We have part of the inverse already:

$x = x' + vt'$
$t = t'$

but where's the rest of it?

One can assume

$n = t'(1 + v/c)$

but this doesn't do much for me.

> Disregarding time differences resulting from the y axis, which will be negligible, both clocks in Galileo's part of the experiment will hit the floor at the same time and will both read the same trime, t'=t. A clock dropped in S' which has the same momentum as S' will hit the floor at t'=t, but will read
>
> $n' = t(1 - v/c)$
> when it hits the floor.
> S is a preferred frame of reference with regard to time, in this case because the train is controlled by the gravitation of the earth, not the other way around. If all clocks in S are synchronized, they will continue to read the same. If all clocks in S' are synchronized, they will continue to read n'=t(1−v/c) unless they are moved relative to S'. A clock that is moved relative to S' has had its velocity changed relative to S and will then read differently from the rest of the clocks in S'. We have considered one such clock which was moved relative to S' to make it conform with the special case, t'=t.
> In any event, these equations show the principle of equivalence to be in effect, regardless of what the Lorentz equations say, and since that is true, Isaac Newton's equations for gravitation should agree with these equations, but I have not yet made a study of that.
> Robert B. Winn

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#191, ewill3@xxxxxxxxxxxxx
Useless C++ Programming Idea #8830129:

std::set<...> v; for(..:iterator i = v.begin(); i != v.end(); i++)
if(*i == thing) {...}

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