Re: Hard SR questions?

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- *From*: jt64@xxxxxxxx
- *Date*: 13 Aug 2006 11:04:35 −0700

N:dlzc D:aol T:com (dlzc) skrev:

> Dear jt64:
>
> <jt64@xxxxxxxx> wrote in message
> news:1154870281.617016.89810@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
>
> > Ship (A) travel 0.99c approaching earth.
>
> Presumably earth = B?
> Presumably the 0.99c is as determined by B?
>
> gamma = ~7
> let c = 300,000 km/sec
>
> > At a distance of 300 000 km as seen from
> > planet (B) inertial frame the ship start a
> > framed TV transmission.
>
> ... assumed the transmission is periodic, continuous, and the
> last frame is completed as A passes B.
>
> > The transmission is such that 60 frames will
> > be sent from ship (A) during the distance of
> > 300 000 km relative earths inertial frame.
> >
> > Now my question.
>
> ... Question*s* ...
>
> > 1. How long time will it take to travel to

> planet using (ship point of view).

"It"? Do you mean the transmission or the ship? It is a continuous data stream, whose last frame exits A's transmitter just as A passes B, right?

The distance travelled during this transmission is (300,000 / 7) km. The ship also measures B moving at 0.99c. So the duration is

1/7 = (1 + 0.99)*t
t = 0.07 sec.

> 2. What is the framerate for the transmission within the ship.(ship point of view)

To meet your givens:
60 / 0.07 = 840 frames per second.

No that would be 420 fps, with perfect certainty, because as you remember...

> From ship point of view time actually slow down by a factor of 7, their

second to travel to earth sending out the 60 frames, actually just take 0,142857....
as measured from within ship.

And you can not argue with that, you could argue with the distance to earth but that is a total other question.

So from the ship point of view the framerate 60/0,142857 =420 fps for the actual *distance* regardless the length as measured from within ship.

So you are actually wrong the framerate will be 420 fps from within ship frame. Because 60 fps leaves ship between point 300 000 km and 0 km and all of the frames will have travelled to earth within one second.

So there is no doubt that during the *distance* no more than actually 420 fps leave the ship because that would increase the dilation by a ratio >7/1

It is easy to check just multiply the distance with 7 to see how many frames actually sent within one second from ship.

(But then again within SR distances not always what they seem to be)

Maybe you think about a stationary ship or a ship who does not suffer from doppler?

If the framerate actually was 840 fps then the distance would be 14*300 000=4200000km for a light second, from within the planet frame of view which would not correspond to the contracted distance.

300 000/0,141 is plain wrong.....

> 3. How long will it take until the front of first frame
> is received at planet.(planet point of view)

How about the frame previous to the one that started emitting at 300,000? The math is cleaner. The one that just finished at 300,000 km arrived 1 second later.

> 4. How long will it take until the ship pass planet.
> (planet point of view)

1 / 0.99 = 1.01 seconds

> (*5*) How long was the time span between the
> first and last frame(planet point of view)

From the *start* of the first frame...

0.01 seconds.
framerate: 60 / 0.01 = 6000 Hz
checking to see if we get ship's gamma:
6000 / 7 = 857 Hz ... the difference between this and 840 Hz is roundoff error.

No one expects you to *like* relativity. But you will find that it is self−consistent.

David A. Smith

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