

# Re: Question about light clock and derivation of time dilation

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*Source:* <http://sci.tech-archive.net/Archive/sci.physics.relativity/2005-07/msg00557.html>

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- *From:* "Androcles" <Androcles@ MyPlace.org>
  - *Date:* Sun, 10 Jul 2005 14:15:14 GMT
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"Daryl McCullough" <stevendaryl3016@xxxxxxxx> wrote in message  
[news:daol15011pu@xxxxxxxxxxxxxxxxxxxx](mailto:news:daol15011pu@xxxxxxxxxxxxxxxxxxxx)

> Androcles says...

>

>>"Daryl McCullough" <stevendaryl3016@xxxxxxxx> wrote

>

>>> Hmm. Usually, the time axis is chosen to be a timelike vector.

>>

>>I think your "timelike vector" lacks an identity.

>

> Look. An event (such as the landing on the moon, the  
> signing of the Magna Carta) is specified by giving (1)  
> a time, and (2) a spatial location. In Cartesian coordinates,  
> this information is specified by 4 numbers: x,y,z, and t.

Look.

We can return to the moon, but not to Neil Armstrong planting a  
footprint in 1979.

We cannot return to Runymede to see Magna Carta signed in 1215 either,  
but we can return to Runymede.

>

> So when we are talking about events, we are talking a 4-dimensional  
> vector space.

Let  $(x_1, y_1, z_1, t_1)$  be a 4-vector.

Let  $(x_2, y_2, z_2, t_2)$  be a 4-vector.

Add the vectors.

$(x_1 - x_2, y_1 - y_2, z_1 - z_2, t_1 - t_2)$

Put in numbers

$x_1 = y_1 = z_1 = t_1 = 1$

$x_2 = y_2 = z_2 = t_2 = -1$

$(1-1, 1-1, 1-1, 1-1) = (0, 0, 0, 0)$

I've now moved from (1,1,1, 1pm)

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to (0,0,0, midday) and gone backwards in time.  
LOOK!

That's true whether you are talking about Galilean  
> relativity or Special Relativity.

Time is not a vector.  
Referring to an event is not the same as re-visiting it.

>>V is a commutative group under addition of vectors  
>> 1.. There exists an additive identity element 0 in V, such that for  
>>all elements v in V,  $v + 0 = v$ .  
>> 2.. For all v in V, there exists an element w in V, such that  $v + w$   
>> =  
>>0.  
>> 3.. Vector addition is associative:  $u + (v + w) = (u + v) + w$ .  
>> 4.. Vector addition is commutative:  $v + w = w + v$ .  
>>[http://en.wikipedia.org/wiki/Vector\\_space](http://en.wikipedia.org/wiki/Vector_space)  
>  
> That's right. In Minkowsky spacetime, the coordinates of  
> an event form a 4-D vector space, with a point in that  
> space specified by the four numbers (t,x,y,z).  
>  
>>So where is your element w so that  $v+w = 0$ ?  
>  
> If v is the vector with components (t,x,y,z), then  
> its inverse is  $(-t,-x,-y,-z)$ .

There is no  $-t$  in the real world, but there are  $-x$ ,  $-y$  and  $-z$ .  
Referring to an event is not the same as visiting it.  
Boring, perhaps, but that's the way it is.  
Of course I have no problem with you REFERRING to  
Minkowski space-time or events in the past,  
but it doesn't reflect physical phenomena today.  
You can't change the past.

>  
>>Or can you travel backward in time to when you were?  
>  
> Who said you could travel backwards in time?

I have no trouble moving back to where I was.  
If time were a vector I could travel back to when I was as well.

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Vectors

> are about \*describing\* the world.

Ok. So add vectors to give me a resultant force and describe where the forces will take the object. Easy. I can predict what will happen.

Now add vectors to describe how I move back in time.

> Just because I can

> write down a vector with a negative time component

> doesn't mean that I can \*move\* in that direction.

So you are not describing the world, then. Your vector with a negative time component cannot be added to another vector that will take you back to the origin. The other components, x,y and z can be negative, and they WILL get you back to the origin.

I cannot predict a past event, it has already happened.

> If e1 is the event at which Jesus was born, and

> e2 is the event at which Aristotle was born, then

> the vector from e1 to e2 has time component  $-384$  years.

Then go to when Aristotle was born. I have no trouble going to Greece, I get on a plane and the pilot uses vectors to get there.  
Androcles.

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• **Follow-Ups:**

◆ **Re: Question about light clock and derivation of time dilation**

◇ From: Daryl McCullough

• **References:**

◆ **Question about light clock and derivation of time dilation**

◇ From: john\_doe\_ph\_d

◆ **Re: Question about light clock and derivation of time dilation**

◇ From: Ken S. Tucker

◆ **Re: Question about light clock and derivation of time dilation**

◇ From: Daryl McCullough

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