

## Critical look at Special relativity from first principles

Roger J Anderton

R.J.Anderton@btinternet.com

Steve Nerlich is a regular writer for Universe Today, is a NASA Deep Space Network volunteer explainer, and is the producer of the supposedly educational Cheap Astronomy podcasts. [1] He offers to help us understand special relativity (SR), so I will look at that:

In his article “Special relativity from first principles” [2] he says: “Einstein’s explanation of special relativity, delivered in his 1905 paper ‘On the Electrodynamics of Moving Bodies’ focuses on demolishing the idea of ‘absolute rest’, exemplified by the theoretical luminiferous aether. He achieved this very successfully, but many hearing that argument today are left puzzled as to why everything seems to depend upon the speed of light in a vacuum.”

Einstein says a lot of things that seem puzzling to people that don't recognise them as nonsensical. Anyway, he proceeds:

“Since few people in the 21st century need convincing that the luminiferous aether does not exist, it is possible to come at the concept of special relativity in a different way and just through an exercise of logic deduce that the universe must have an absolute speed – and from there deduce special relativity as a logical consequence.”

I wonder who these few people are that don't need convincing on that issue.

Tom Bethell points out [3]: “Many people know that in his special theory of relativity, Einstein abolished the luminiferous medium, or ether. Very few know that eleven years later he reintroduced a rather different ether. It is never mentioned in the Easy Einstein books and hardly ever in Einstein biographies.”

So, the ether exists.

Anyway, Nerlich wants to proceed from assuming the ether does not exist. For the sake of argument, that starting point and see where it leads him. So, given no ether how can we deduce there is an absolute speed? Nerlich goes through the steps, step 1 is-Nerlich: The argument goes like this:

- 1) There must be an absolute speed in any universe since speed is a measure of distance moved over time. Increasing your speed means you reduce your travel time between a distance A to B. At least theoretically you should be able to increase your speed up to the point where that travel time declines to zero – and whatever speed you are at when that happens will represent the universe’s absolute speed.

That's rubbish. Given a speed  $v$  and distance  $L$  between A and B and a travel time  $T$  such that  $v=L/T$  when  $T=0$  then  $v= L/0 = \text{infinity}$ ; that’s any speed is allowed; there’s no finite absolute speed. The other steps in the argument depend on this step (1) and its nonsense.

So, even allowing him to start from a false premise, he just degenerates into nonsense. And he is supposed to be helping people to believe this nonsense.

As per one of the comments to his article - it notes that all Nerlich has done is assume that there is an absolute speed. He was supposed to be showing there was an absolute speed, instead he assumed it. There are of course numerous articles in support of Einstein on the web seeking to explain SR and in fact explaining nothing. Einstein is just an icon of a genius that they faithfully follow, and they don't even realise that what they follow Einstein as having said, he changed his mind on.

## References

[1] <http://lifeboat.com/ex/bios.steve.nerlich>

[2] Special relativity from first principles [December 19, 2011](http://www.physorg.com/news/2011-12-special-relativity-principles.html) By Steve Nerlich, Universe Today  
<http://www.physorg.com/news/2011-12-special-relativity-principles.html>

[3] Einstein's Revolution and Counter-revolution, Tom Bethell, June 2007 issue of *The American Spectator*. <http://spectator.org/archives/2007/06/21/einsteins-revolution-and-count/1>

Nerlich's argument is:

- 1) There must be an absolute speed in any universe since speed is a measure of distance moved over time. Increasing your speed means you reduce your travel time between a distance A to B. At least theoretically you should be able to increase your speed up to the point where that travel time declines to zero – and whatever speed you are at when that happens will represent the universe's absolute speed.
- 2) Now consider the principle of relativity. Einstein talked about trains and platforms to describe different inertial frame of references. So, for example, you can measure someone throwing a ball forward at 10 km/hr on the platform. But put that someone on the train which is travelling at 60 km/hr and then the ball measurably moves forward at nearly 70 km/hr (relative to the platform).
- 3) Point 2 is a big problem for a universe that has an absolute speed (see Point 1). For example, if you had an instrument that projected something forward at the absolute speed of the universe and then put that instrument on the train – you would expect to be able to measure something moving at the absolute speed + 60 km/hr.
- 4) Einstein deduced that when you observe something moving at the absolute speed in a different frame of reference to your own, the components of speed (i.e. distance and time), must change in that other frame of reference to ensure that anything moving at the absolute speed can never be measured moving at a speed greater than the absolute speed.

Thus, on the train, distances should contract, and time should dilate (since time is the denominator of distance over time).

My comments c.RJAnderton2012

Typo corrections: 9 Oct 2018