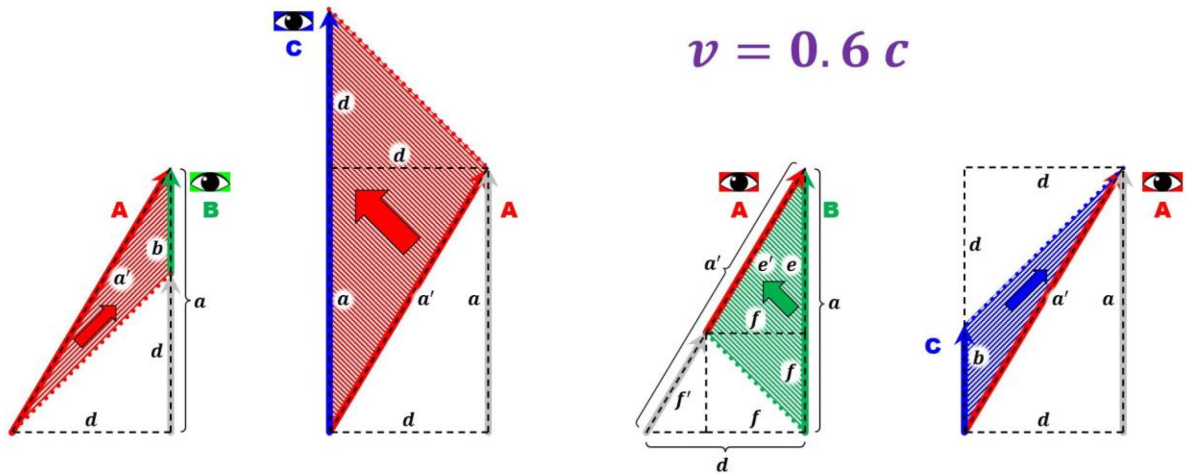
[2023-01-20.21:19 Fri> The four observable time ratios for A launched to B at velocity v



(a) B:A (b) C:A (c) A:B (d) A:C

Goal: Find sigmas in terms of unitless velocity β. These equations apply to all figures:

$$\beta = \frac{d}{a} \qquad a = \frac{d}{\beta} \qquad d = a\beta \qquad \gamma = \frac{1}{\sqrt{1-\beta^2}} = \frac{1}{\sqrt{(1+\beta)(1-\beta)}} \qquad R = \sqrt{\frac{1+\beta}{1-\beta}}$$

$$t(a') = \frac{a}{\gamma} = a\sqrt{1-\beta^2}$$

(a) B:A = R [converging case]

$$\sigma_{B:A} = \frac{t(a')}{t(b)} = R$$

$$t(a') = a\sqrt{1-\beta^2}$$
$$t(b) = b = a - d = a - a\beta = a(1-\beta)$$

$$\sigma_{B:A} = \frac{t(a')}{t(b)} = \frac{a\sqrt{1-\beta^2}}{a(1-\beta)} = \frac{\sqrt{1-\beta^2}}{(1-\beta)} = \sqrt{\frac{(1+\beta)(1-\beta)}{(1-\beta)^2}} = \sqrt{\frac{1+\beta}{1-\beta}} = R$$

(b) C:A = 1/R [diverging case]

$$\sigma_{C:A} = \frac{t(a')}{t(a+d)} = \frac{1}{R}$$

$$t(a') = a\sqrt{1-\beta^2}$$
$$t(a+d) = a + d = a + a\beta = a(1+\beta)$$

$$\sigma_{C:A} = \frac{t(a')}{t(a+d)} = \frac{a\sqrt{1-\beta^2}}{a(1+\beta)} = \frac{\sqrt{1-\beta^2}}{(1+\beta)} = \sqrt{\frac{(1+\beta)(1-\beta)}{(1+\beta)^2}} = \sqrt{\frac{1-\beta}{1+\beta}} = \frac{1}{R}$$

[2023-01-20.22:43 Fri]

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(b) A:B = R [converging case]

$$\sigma_{C:A} = \frac{t(a)}{t(e')} = R$$

$$t(a) = a$$
$$t(e') = \left(\frac{e}{a}\right) t(a') = \left(\frac{e}{a}\right) a\sqrt{1-\beta^2} = e\sqrt{1-\beta^2}$$

$$e = \frac{f}{\beta} \qquad \text{and} \qquad e = a - f \;\Rightarrow\; \frac{f}{\beta} = a - f \;\Rightarrow\; f + \frac{f}{\beta} = a \;\Rightarrow\; f\left(1 + \frac{1}{\beta}\right) = a$$

$$f = \frac{a}{1+\frac{1}{\beta}} = \frac{a}{\left(\frac{\beta+1}{\beta}\right)} = \frac{a\beta}{1+\beta}$$

$$e = \frac{f}{\beta} = \frac{\left(\frac{a\beta}{1+\beta}\right)}{\beta} = \frac{a}{1+\beta}$$

$$t(e') = e\sqrt{1-\beta^2} = \left(\frac{a}{1+\beta}\right)\sqrt{1-\beta^2} = a\left(\frac{\sqrt{1-\beta^2}}{1+\beta}\right) = a\left(\sqrt{\frac{(1+\beta)(1-\beta)}{(1+\beta)^2}}\right) = a\left(\sqrt{\frac{1-\beta}{1+\beta}}\right) = \frac{a}{R}$$

$$\sigma_{C:A} = \frac{t(a)}{t(e')} = \frac{a}{\left(\frac{a}{R}\right)} = R$$

(b) A:C = 1/R [diverging case]

$$\sigma_{A:C} = \frac{t(b)}{t(a')} = \frac{1}{R}$$

$$t(b) = a - d = a - a\beta = a(1-\beta)$$
$$t(a') = a\sqrt{1-\beta^2}$$

$$\sigma_{A:C} = \frac{t(b)}{t(a')} = \frac{a(1-\beta)}{a\sqrt{1-\beta^2}} = \frac{1-\beta}{\sqrt{1-\beta^2}} = \sqrt{\frac{(1-\beta)^2}{(1+\beta)(1-\beta)}} = \sqrt{\frac{1-\beta}{1+\beta}} = \frac{1}{R}$$

So the result is as expected, but still fascinating: When the two objects are diverging — cases (b) and (d) — the sigma factor is a slowdown of 1/R. When the two objects are approaching — cases (a) and (c) — the sigma factor is a speed up of R. To say that this doesn't look much like Lorentz is an understatement. The difference in the results goes back not to this, though, since the Ratio factors *are* symmetric. The difference there, which I must still analyze still, is in *when* the speedup become applicable. The dilation is more like conversion of space-distance into time-distance. [2023-01-21.00:06 Sat]

[2023-01-21.20:57 Sat> How continuum faith devasted physics -- Lorentz area metrics

Date: Sat, 21 Jan 2023 12:22:19 -0500
Subject: Re: NYTimes.com: What Happened to All of Science's Big Breakthroughs?
From: Terry Bollinger
To: Roger
Cc: Jack

Roger, Jack,

This is a valid concern, and at the core of the problem are all the variants of the infinite-smoothness (implicit) hypothesis, which, alas, makes much of physics entirely classical before you even start. Worse, the grandfathered-in free-energy, free-noise assumption of continuum mathematics leads to the explosion of noise exemplified by superstring theory, quantum gravity, and many worlds.

There are subtler aspects to it. Folks keep trying to make the universe higher-dimensional, feeling that the "simplicity" of entirely orthogonal axes must be the proper resolution path. I can't even find four. When Minkowski said, "space and time are one," I don't think even he realized how deep that goes.

For example, in terms of relativistic time dilation and space contraction, the SI-based unit that corresponds best to what we interpret in xyzt coordinates as "1 meter" is this decidedly odd beast:

$$0.000057755 \sqrt{[m \cdot s]} = 57.755 \times 10^{-6} \sqrt{[m \cdot s]} = 57.755 \text{ micro-sms } (\mu sms)$$

The "sms" unit means the "Square root of 1 Meter times 1 Second". I don't know what else to call it. If you are looking at something that far away from you that is stationary relative to you, 57.755 μsms looks like a meter. If you are moving at the speed of light, it looks like 3.335 nanoseconds of time difference. It's one or the other because it's just different shapes of a single conserved quantity, a Lorentz area that is the square of the μsms measure. For example, squaring the μsms of 1 meter gives:

3.33564002 meter·nanoseconds

... which squooshes (tech term) into either 1 meter or 3.33564002 nanoseconds, the time it takes light to cross one meter.

The prevalent idea that "everything" time dilates when you are moving doesn't begin to capture any of this correctly. It is, at best, a special-case-only hack. You can only resolve it by recognizing that clocks aren't always point-like and that when you are moving fast inside of a more extensive clock system, time moves *faster* by R ahead of you and *slower* behind you by 1/R, where $R=\sqrt{[(1-\beta)/(1-\beta)]}$. The narrow Lorentz gamma time dilation case corresponds only to transverse micro-clocks, which at the distance limit of zero (collision!) average the R and 1/R, $\gamma = (R + 1/R) / 2$.

The quasar cosmic jet folks came close to getting this right several decades ago when presented with data that seemed to contradict SR. However, they then persuaded themselves it was an optical illusion and labeled the same equation I called R as the "relativistic Doppler." That was a fascinating find! The difficulty is that *only* this "optical illusion" produces the correct prediction of time elapses when such systems collide, while Lorentz factors give nonsense. A pretty real "optical illusion," that!

Anyway, enough. All of this need fixing or physics will never get anywhere. Abandoning Einstein's oversimplified "all clocks are points" version of special relativity and moving to a less-mystical, more calculable sms distance model is only a starting point.

Cheers,
Terry

[Addendum sent at 2023-01-21.20:54 EST]

Roger,

… I just noticed that a micro-sms is a nicely human scale measurement -- at least in length, certainly not in time:

1 micro-sms (μsms) = 1.73145 cm = 0.681673 inches

Cheers,
Terry

[2023-01-21.21:02 EST Sat]