The Relativistic Space-Time Perspective

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1.0 Abstract

This paper formulates additional Relativistic equations. They do not contradict Special Relativity. They examine the deductions of Dr. Einstein from a relativistically distorted perspective. It reasons that the REAL||non-Relativistic velocity value can be distorted just as the Length|Time|Mass values are. The equations examine the both the true/Real (not Special Relativistically Distorted||noSRD) Velocity of an object and use it to determine the distorted (Special Relativistically Distorted||SRD) Velocity for the same object. It also derives opposite equations that calculate the noSRD velocity||$\text{Velocity}_{\text{noSRD}}$ from the SRD velocity||$\text{Velocity}_{\text{SRD}}$.

A Relativistically distorted traveller would not observe actions moving more slowly – it would be everything else outside was going faster. Fewer seconds for a Relativistic Perspective that has distortion means the perspective equations have a different relation. They calculate higher Velocity perceived by the observers.

Two example equations show the relation of two points of view. The independent variables have no Relativistic deformation |$\text{Velocity}_{\text{noSRD}}$|; dependent variable would be the value||velocity reasoned to be observed because of the Relativistic deformation |$\text{Velocity}_{\text{SRD}}$|.

$$\text{Velocity}_{\text{SRD}} = \text{Velocity}_{\text{noSRD}}/(1 - \text{Velocity}_{\text{noSRD}}{}^2/c^2)^{½}$$

Less Time will go by when there is a relativistic deformation, so the Velocity will appear distorted just as the Length/Time/Mass are. The inverse relation would be where the independent variables were the observed Velocity from the Relativistic or distorted view |$\text{Velocity}_{\text{SRD}}$|. The dependent variable would be the True/non-Relativistic/non-distorted Velocity |$\text{Velocity}_{\text{noSRD}}$|. The parallel equation for that Relativistic Perspective:

$$\text{Velocity}_{\text{noSRD}}= \text{Velocity}_{\text{SRD}} /(1 + \text{Velocity}_{\text{SRD}}{}^2/c^{2)½}$$

This relationship allows the additional development of 8 formula/equations for the velocity, the mass, the Time, and the linear deformation. These equations are all of the two Perspectives.

The equations developed in this paper are an absolute advance, but they are more "housekeeping" advances than significant ones. But they do lead to parallel equations in General Relativity that have considerable Cosmological significance in a later submission.

2.0 Relativistic vs. Non-Relativistic Velocity

Special Relativistic Distortion (SRD) determines the relationship between Real & apparent Relativistic Velocity.

It is derived from the Time equation. In Classic Special Relativity, "Real" labels are approximates. All observable objects in the Universe are in motion so determining an exact Velocity or a zero Velocity from the observed Velocity is impossible – so thus an exact relativistic effect is the same. Rest/Real labels are theoretical concepts, not confirmable data – but the relationship between relativistic and non-relativistic values is deducible. In the classic Time distortion equation:

- c – speed of light (299,792,458[a] m/s)
- Time – Real seconds that would pass for any defined event (i.e. the decay rate for any unstable substance) for a non-moving body under no Special Relativistic distortion
- Time' – Real seconds that would pass for the same event on a body under Special Relativistic distortion
- $Velocity_{Real}$ – observed Velocity from an under Real-Time/at rest/no apparent Special Relativistic distortion viewpoint

$$Time' = Time/(1-Velocity_{Real}^2/c^2)^{1/2}$$

In the above equation, the Time seconds are the number of Real seconds that would pass for an action where both the viewpoint and the observed object were not distorted. The Time' seconds are the greater number of Real seconds observed to take place for a know action on a relativistically distorted object – i.e. the half-life of Uranium 235 would lengthen under distortion.

An alternative would be to relate the number of seconds that will pass on the distorted object. So let us define two new more variables, ones that will recognize that Relativistic seconds will be the inverse of Real seconds. If the distortion factor is two, then as 2 Real seconds pass, 1 Relativistic second will pass. Fewer relativistic seconds pass for any given number or Real/non-relativistic seconds. So a definition of the inverse equation would use the under SRD Time perspective. The independent Velocity variable would use the Real/non-Relativistic Time values. It is legitimate to have Real and Relativistic values in any equation – providing they are the same on both sides (i.e. only Relativistic seconds & only real metres).

- $numsec_{Real}$ - number of Relativistic seconds passing on a non-moving body from a viewpoint under no distortion (i.e. the exact parallel to the |Time| variable in the Classic Relativity equations)

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[a] Penrose, R (2004). *The Road to Reality: A Complete Guide to the Laws of the Universe*. Vintage Books. pp. 410–1. ISBN 978-0-679-77631-4. "... the most accurate standard for the metre is conveniently *defined* so that there are exactly 299,792,458 of them to the distance travelled by light in a standard second, giving a value for the metre that very accurately matches the now inadequately precise standard metre rule in Paris."

$numsec_{SRD}$ - seconds passing for a body under Special Relativistic distortion from an SRD Velocity viewpoint. In the case of the below equation, the |numsec| variables have solely Relativistic seconds in their definition.

$$numsec_{Real} = numsec_{SRD}/(1 - Velocity_{Real}^2/c^2)^{½}$$

Or, so both Real undistorted values on are the same side of the equation

$$numsec_{SRD} = numsec_{Real}*(1 - Velocity_{Real}^2/c^2)^{½}$$

We will be more specific about the "Real" values. Another valid label for Real seconds would be noSRD seconds (applicable for any Time unit under no Special Relativistic distortion). The $Velocity_{noSRD}$ variable presumes that the Time value in it is subject to Relativistic distortion, but the displacement remains as the Real/noSRD value. That is despite the fact that because of the linear distortion, the whole Universe has gotten longer. It hasn't, it is just your view because you have gotten shorter(!)

$Velocity_{noSRD}$ - Velocity observed from a viewpoint under no SRD
$numsec_{noSRD}$ - number of Relativistic seconds passing on a body/viewpoint under no SRD

Velocity is inversely related to passage of Time. So then dividing both sides with 1 Real/noSRD metre allows a change so the equation determines Relativistic/non-Relativistic Velocity instead of Time distortion.

$$numsec_{SRD} = numsec_{noSRD}*(1 - Velocity_{noSRD}^2/c^2)^{½}$$
$$numsec_{SRD}/(1m_{noSRD}) = (numsec_{noSRD}/(1m_{noSRD})) * (1-Velocity_{noSRD}^2/c^2)^{½}$$

Inverting the equation:

$$1m_{noSRD}/numsec_{SRD} = (1m_{noSRD}/numsec_{noSRD}) / (1-Velocity_{noSRD}^2/c^2)^{½}$$

We will set the variable $numsec_{noSRD}$ to the following value:

$$numsec_{noSRD} = 1m_{noSRD} /Velocity_{noSRD}$$

so

$$Velocity_{noSRD} = 1m_{noSRD} /numsec_{noSRD}$$

That will mean:

$$1m/numsec_{SRD} = Velocity_{noSRD} / (1-Velocity_{noSRD}^2/c^2)^{½}$$

It is then perfectly valid to define $Velocity_{SRD}$ and $numsec_{SRD}$ in a parallel fashion to that of $|Velocity_{noSRD}||numsec_{noSRD}|$:

$Velocity_{SRD}$ - Velocity observed from a viewpoint under SRD

$numsec_{SRD}$ - number of Relativistic seconds passing on a body/viewpoint under SRD

So

$$Velocity_{SRD} = Velocity_{noSRD} / (1-Velocity_{NoSRD}^2/c^2)^{½} \qquad \text{Equation 1}$$

Everything in the Universe has a Velocity. Defining a point at rest – particularly when General Relativistic distortions are considered – is impossible. When we determine the speed of light, we do it from a viewpoint assumed to have minimal/zero Relativistic distortion – and presuming an ideal is a perfectly valid scientific/logic strategy.

So let us examine <u>all</u> Relativistic distortion not from a <u>Real</u> viewpoint, but a theoretic one under no/zero Special Relativistic Distortion (noSRD). A zero Velocity for an object may be completely indeterminate; that does not mean it is mathematically indefinable. "F=ma" is an idealized criteria proposition. All the forces acting upon a body cannot be determined perfectly: they can be estimated but not without some inaccuracy. Even more crucially, when Newton wrote that law he did not (for simplicities sake) allow for all the acceleration vectors. Two equal forces could be moving against a single object, with exactly opposite vectors, and the body would not accelerate. That would not mean there was no force acting on the object. "$F=GMm/r^2$" faces the same limitations: there are always many more than two bodies of mass, exerting forces with a different energy and vectors. But both equations are useful in making predictions of Real actions and in estimating all the forces acting on a body. We will avoid using the invariably prejudicing <u>Real/Rest</u> designation and simply presume a zero Velocity/zero Relativistic effects in the definition of the two additional variables.

So again with Equation 1:

$$\text{Velocity}_{SRD} = \text{Velocity}_{noSRD}/(1 - \text{Velocity}_{noSRD}{}^2/c^2)^{1/2} \qquad \text{Equation 1}$$

Squaring both sides of the equation to determine its inverse form:

$$\text{Velocity}_{SRD}{}^2 = \text{Velocity}_{noSRD}{}^2/(1 - \text{Velocity}_{noSRD}{}^2/c^2)$$

Multiplying both sides with the $|(1 - \text{Velocity}_{noSRD}{}^2/c^2)|$ expression

$$\text{Velocity}_{SRD}{}^2 * (1 - \text{Velocity}_{noSRD}{}^2/c^2) = \cancel{(1 - \text{Velocity}_{noSRD}{}^2/c^2)} * (\text{Velocity}_{noSRD}{}^2/\cancel{(1 - \text{Velocity}_{noSRD}{}^2/c^2)})$$

Expanding $\|\text{Velocity}_{SRD}{}^2 * (1 - \text{Velocity}_{noSRD}{}^2/c^2)\|$:

$$\text{Velocity}_{SRD}{}^2 - \text{Velocity}_{SRD}{}^2 * \text{Velocity}_{noSRD}{}^2/c^2 = \text{Velocity}_{noSRD}{}^2$$

<u>Adding</u> $\|(\text{Velocity}_{SRD}{}^2 * \text{Velocity}_{noSRD}{}^2/c^2)\|$ to both sides:

$$(\text{Velocity}_{SRD}{}^2 - \cancel{\text{Velocity}_{SRD}{}^2 * \text{Velocity}_{noSRD}{}^2/c^2}) + (\cancel{\text{Velocity}_{SRD}{}^2 * \text{Velocity}_{noSRD}{}^2/c^2}) = \text{Velocity}_{noSRD}{}^2 + \text{Velocity}_{SRD}{}^2 * \text{Velocity}_{noSRD}{}^2/c^2$$

Simplifying the $\|\text{Velocity}_{noSRD}{}^2 + \text{Velocity}_{SRD}{}^2 * \text{Velocity}_{noSRD}{}^2/c^2\|$ expression

$$\text{Velocity}_{SRD}{}^2 = \text{Velocity}_{noSRD}{}^2 * (1 + \text{Velocity}_{SRD}{}^2/c^2)$$

Dividing both sides with $\|(1 + \text{Velocity}_{SRD}{}^2/c^2)\|$

$$\text{Velocity}_{SRD}{}^2 / (1 + \text{Velocity}_{SRD}{}^2/c^2) = (\text{Velocity}_{noSRD}{}^2 * \cancel{(1 + \text{Velocity}_{SRD}{}^2/c^2)}) / \cancel{(1 + \text{Velocity}_{SRD}{}^2/c^2)}$$

Thus,

$$\text{Velocity}_{SRD}{}^2 / (1 + \text{Velocity}_{SRD}{}^2/c^2) = \text{Velocity}_{noSRD}{}^2$$

Or

$$\text{Velocity}_{noSRD}{}^2 = \text{Velocity}_{SRD}{}^2/(1 + \text{Velocity}_{SRD}{}^2/c^2)$$

And taking the square root of both sides

$$(\text{Velocity}_{noSRD}{}^{\cancel{2}})^{\cancel{1/2}} = (\text{Velocity}_{SRD}{}^{\cancel{2}})^{\cancel{1/2}} / (1 + \text{Velocity}_{SRD}{}^2/c^2)^{1/2}$$

So

$$\text{Velocity}_{noSRD} = \text{Velocity}_{SRD} / (1 + \text{Velocity}_{SRD}{}^2/c^2)^{1/2} \qquad \text{Equation 2}$$

For a new equation, define the "Time" variables more generally:

Time - Time passing in seconds/minute/hours under no Special Relativistic distortion from a no SRD Velocity viewpoint
Time' - Time in passing seconds/minute/hours under Special Relativistic distortion from a no SRD Velocity viewpoint

The above was confirmed using $|Time' = Time/(1 - Velocity_{noSRD}^2/c^2)^{½}|$ to calculate relativistic Velocity by multiplying the noSRD Velocity by the |Time/Time'| proportion. The range of Real [noSRD] velocities was from |1.0E-500 m/s| to |c – (1.0E-500) m/s|. Velocity is an observable distortion on a moving object. Apparent (SRD) Velocity is immediately observable, sharing the Equation 2 relationship with the noSRD Velocity. The validity of observed Relativistic Velocity is uncertain, but so is the Real Velocity used in Velocity equations.

Both Velocity equations can also mean (for Equation 1):

$$Velocity_{SRD} = Velocity_{noSRD}/(1 - Velocity_{noSRD}^2/c^2)^{½} \qquad \text{Equation 1}$$

Divide both sides with $Velocity_{noSRD}$

$$Velocity_{SRD} / Velocity_{noSRD} = ((\cancel{Velocity_{noSRD}}/(1 - Velocity_{noSRD}^2/c^2)^{½})/ \cancel{Velocity_{noSRD}}$$

So

$$Velocity_{SRD}/Velocity_{noSRD} = 1/(1 - Velocity_{noSRD}^2/c^2)^{½}$$

Or

$$Velocity_{noSRD}/Velocity_{SRD} = (1 - Velocity_{noSRD}^2/c^2)^{½}$$

And Equation 2

$$Velocity_{noSRD} = Velocity_{SRD} / (1 + Velocity_{SRD}^2/c^2) \qquad \text{Equation 2}$$

Alternately with Equation 2, divide both sides with $Velocity_{SRD}$

$$Velocity_{noSRD} / Velocity_{SRD} = ((\cancel{Velocity_{SRD}}/(1 + Velocity_{noSRD}^2/c^2)^{½})/ \cancel{Velocity_{SRD}}$$

So it can also mean both that:

$$Velocity_{noSRD}/Velocity_{SRD} = 1/(1 + Velocity_{SRD}^2/c^2)^{½}$$

And

$$Velocity_{SRD}/Velocity_{noSRD}= (1 + Velocity_{SRD}^2/c^2)^{½}$$

The existence of these proportions mean that the "$(1 - \text{Velocity}_{noSRD}{}^2/c^2)^{½}$" and the "$(1 + \text{Velocity}_{SRD}{}^2/c^2)^{½}$ expressions can be interchanged by inverting the proportion.

That distortion, both Gravitational and Special Relativistic form part of the entire visible environment||reality. Zero Velocity can be estimated, but by definition of the Time equations in Special Relativity all velocities have some relativistic factor. So Velocity_{Real} values used in any relativistic equation are **approximate**. The terms should not be Relativistic and Real but rather Relativistic and Non-Relativistic. Any outside observed Velocity is as valid as a relativistic Velocity. The sole issue is the precision of the value. For lower velocities: "noSRD". For higher velocities the "SRD" would be better, indicating the need for conversion to a non-relativistically distorted value, to make it more accurate – but still not absolutely precise.

A final note should be made: the above presumes that it would be possible to measure variables that would determine the velocity. Again, that presumption is for an ideal undistorted viewpoint. As in all of Science, an ideal can be presumed – but it would not actually be possible to go anywhere near a relativistic velocity. That velocity would distort different variables in a different fashion. The most obvious is mass of matter and velocity of any Boson particle. While the matter would increase in mass, all Bosons would decrease in both velocity and mass. So the relationship between the two would become dysfunctional. All elements would dissemble to their component protons, neutrons and electrons – Gluons would be weakened to degree approaching infinitesimal. While the repulsive force of positive charge would weaken to the same degree the mass of the nucleons bound together would have a matching increase. Any passenger aboard a vessel moving at a relativistic velocity would find themselves both gaining weight and losing muscular force.

2.1 Additional Relativistic Equations

Additional formulae can be used for deductions of conditions for bodies at rest in time, length and mass. Relativistic/non-relativistic ratios are always the same. The Velocity distortion equation allows development of additional Relativistic equations. The ratio of distorted apparent SRD Velocity to noSRD Velocity ($Velocity_{SRD}$/ $Velocity_{noSRD}$) is identical to relativistic ratios: all use the same "$(1-Velocity_{noSRD}^2/c^2)^{½}$" expression.

The Time distortion equation referred to earlier:

$$Time' = Time/(1 - Velocity_{noSRD}^2/c^2)^{½}$$

replacing $(1 - Velocity_{noSRD}^2/c^2)^{½}$

$$Time' = Time/(Velocity_{SRD}/Velocity_{noSRD})$$
$$Time = Time'*(Velocity_{SRD}/Velocity_{noSRD})$$
$$Time = Time'/(Velocity_{noSRD}/Velocity_{SRD})$$

Since

$$Velocity_{noSRD}/Velocity_{SRD} = (1 + Velocity_{noSRD}^2/c^2)^{½}$$

Then

$$Time = Time'/(1 + Velocity_{SRD}^2/c^2)^{½} \quad \text{Equation 3}$$

Or:

$$Time_{noSRD} = Time_{SRD}/(1 + Velocity_{SRD}{}^2/c^2)^{½}$$

The other equations, using the SRD/noSRD labels are the same logical structure. The mass distortion does not change the apparent Velocity:

$Mass_{SRD}$ - mass of a body under Special Relativistic distortion from an SRD Velocity viewpoint

$Mass_{noSRD}$ - mass under no Special Relativistic distortion from an SRD Velocity viewpoint

$$Mass_{SRD} =Mass_{noSRD}/(1 - Velocity_{noSRD}^2/c^2)^{½} \quad \text{Equation 4}$$

$$Mass_{SRD}* (Velocity_{SRD} /Velocity_{noSRD}) = Mass_{noSRD}$$
$$Mass_{SRD} / (Velocity_{noSRD} /Velocity_{SRD}) = Mass_{noSRD}$$
$$Mass_{noSRD} = Mass_{SRD} /(Velocity_{noSRD} /Velocity_{SRD})$$

Replacing ($Velocity_{noSRD}$ /$Velocity_{SRD}$)

$$Mass_{noSRD} = Mass_{SRD}/(1 + Velocity_{SRD}^2/c^2)^{½} \quad \text{Equation 6}$$

The length distortions will distort the apparent distance from the viewpoint of the moving body, but the logic of the distance will remain the same:

$Length_{SRD}$ - Length of a body under Special Relativistic distortion from an SRD Velocity viewpoint
$Length_{noSRD}$ - Length of a body under no relativistic distortion for an SRD Velocity viewpoint

$$Length_{SRD} = Length_{noSRD}*(1 - Velocity_{noSRD}^2/c^2)^{½} \qquad \text{Equation 7}$$
$$Length_{SRD} = Length_{noSRD} * (Velocity_{noSRD} / Velocity_{SRD})$$
$$Length_{noSRD} = Length_{SRD} / (Velocity_{noSRD} / Velocity_{SRD})$$
$$Length_{noSRD} = Length_{SRD} * (Velocity_{SRD} / Velocity_{noSRD})$$

Replacing ($Velocity_{SRD}$ /$Velocity_{noSRD}$)

$$Length_{noSRD} = Length_{SRD} * (1 + Velocity_{SRD}^2/c^2)^{½} \qquad \text{Equation 8}$$

By current equations, the Velocity can appear to reach or exceed light speed from the viewpoint of a moving body because of relativistic distortions. Distortions in observed bodies are then calculated with "$(1 + Velocity_{SRD}^2/c^2)^{½}$" for a moving viewpoint to calculate the Real Velocity – the Velocity with no relativistic distortions. Relativistic Perspective equations determine relativistic distortions from moving observation points.

The comparative value of the Classic Einsteinian Relativity equations and Relativistic Perspective equations are Velocity dependent. The Einsteinian equations are more appropriate for low speeds. Motion is relative in any observation point – planetary, stellar system, galactic system, or galactic grouping. So it is impossible to know the exact value for "Velocity". If all observed objects show a large blue shift - including a point where that shift was highest – that would indicate a relativistic Time shift because of the Velocity of the measuring device. If that is not observed, assume the observation point is immobile and use Einsteinian equations. Alternatively large motions should use a combination of the Einsteinian and the Relativistic Perspective equations to estimate the speed and vector of the observed point.

Relativistic Perspective equations determine relativistic values (velocity, time, mass, and length) from the corresponding non-relativistic values. It can then convert those relativistic numbers back to their original, non-relativistic value. Relativistic Perspective equations have been confirmed correct to 2000 significant digits for 37 Velocity values ranging from 1.0E-500m/s to |c – (1.0E-500)|m/s. The confirmations are comprehensive and are available upon request. The values done to 2000 digits showed a maximum error of ±1.0E-1992. The error was entirely because of the properties of irrational numbers; values calculated to 100 digits showed a maximum error of ±1.0E-92, the same values done to 1000 digits, showed a maximum error of ±1.0E-992. For the larger Velocity values any error is then multiplied by the Velocity of light, it "amplifies" that error. Checking the error from a mass/time/length value of "1" leads to the disappearance of that error.

2.1 Other Consequences of Relativistic Distortion

The above equations also make suggestion about Relativistic effects. If an object were to move at a Relativistic velocity the consequences are not completely recognized by Science. It would both:

a) Slow down the transmission of all Bosons. The absolute degree of that slowdown for different Boson varieties is not completely documented in current Science, but it is an unreasonable proposition that some Bosons would slow down, and some wouldn't.
b) Increase the mass of all the matter particles.

That would mean that any Quantum level interaction would be both dealing with heavier particles and dealing with them with slower (and therefore weaker) Bosonic forces. Time would not simply slow down, the interactions that maintain the structure of any macro level device would weaken. The object would not function as it did at rest. Again, the mass of the individual particles would increase, and the forces that maintained its quantum structure would weaken. There would perhaps be an equal balance of weaken between the repulsive force of positive charge of protons and bonding force of the Gluons. But that would mean there would be an overall weakening of atomic structure. The increase of the mass of the particles would also mean that they would be colliding with greater kinetic force. The alterations that occur at very non-Relativistic level would change the fundamental Quantum interactions, but only to a marginal degree. An observed Relativistic scale recession velocity could alternately indicate a Relativistic scale distance and Boson decay, not a Universal expansion. So alternate explanations for the increasing Red Shift of inter-Galactic scale distances could be valid (i.e. EM frequency decay over those distances. That supposition will be examined more carefully in following papers). The table of a range of 39 $\text{Velocity}_{\text{noSRD}}$ values that confirm [[ref: perspective_distortion_cosmic_egg.smc]] the velocity equations is available on request.

3.0 Summary

This paper formulated additional Relativistic equations. The equations do not contradict Special Relativity. They are the same equations from a Relativistic viewpoint. The equations presented examine Special Relativistic distortions from the perspective of the distorted object, determining the non-relativistic Velocity from observed Velocity in the moving object. The value of the non-relativistic Velocity and the apparent relativistic Velocity it engenders share exactly the same validity. The equations relating those two perspectives are documented in this paper.
The most crucial equation:

$$\text{Time} = \text{Time}'/(1+\text{Velocity}_{\text{SRD}}^2/c^2)$$

– establishes the principle of Velocity distortion and its consequences. The equations formulated in this paper relating perspectives have implications for the relativistic contradictions of current Big Bang theory.

Anonymity
I have no desire for anonymity, and can be contacted by whatever mechanism the reader/editor requires.