ON THE MATHEMATICS OF SPECIAL RELATIVITY

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ABSTRACT

It was once said that only three people in the world understood relativity to which Eddington an astronomer/physicist replied *"who is the third"*. This statement by Einstein was a little forward considering the simplicity of the foundational theory of the paper itself. It may be the case that due to the disingenuous insertion of conditional statements and erroneous assumptions he realized that the paper itself was so erroneous that it may indeed be seen to be incomprehensible to the unguarded reader. It also appears that he was effective in his quest as the number of advocates of Einstein's special relativity increases daily, who have neither the desire nor inclination to investigate further but rather accept purely on face value Einstein's assertions. The arduous task of investigation and validation of his theories being left to a small but also increasing number of dedicated independent researchers who refuse to bow to the logical fallacy of appealing to authority.

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1. Introduction

Before beginning with an analysis of Einstein's Special Relativity it should be understood that there is no empirical evidence that Einstein's theory is correct. Everything quoted by the advocates of the theory are either false or simply theories based upon mathematical abstractions. An example of two of the most popular urban legends being;

- The development of the atomic bomb being in its simplest explanation nothing more than a chain reaction has nothing to do with Einstein's theory.
- GPS does not take into account Einstein's theory. When an IPhone is seen connected to a power supply the size of a Volkswagen powering a built in cesium atomic clock then it may be considered a possibility.

This paper is a detailed explanation of the equations used in Einstein's 1905 paper "On the Electrodynamics of moving bodies"[i] more commonly referred to as special relativity. The analysis is extremely detailed describing the main equations and parameters. When analyzed, it will be shown that almost every equation contains in the major part at least one fatal error. It will also be shown that Einstein attempts to hide these errors by misdirecting the reader, using the same symbol to represent different operations, and obfuscating explanations. In his first equation he makes a clearly erroneous statement in plain view, knowing that the casual reader will not attach significance to it but rather just accept it on face value, thereby laying the unproven foundations for the entire theory. For the sake of convenience the errors within Einstein's paper are highlighted in red and bold type.

Throughout his paper Einstein uses several functions and because of this an exact description of a function is in order. A function is a procedure which takes one or more parameters, performs some operation using them and then returns a value. A function could be something like $f(a,b)$ this function for example could be made to add the two parameters a and b and then return the result of the addition, therefore $f(1,2) = 3$ but the operation is hidden, consequently in mathematics in order that the operation performed is in clear view it is often shown as $f(1+2)$.

2. Analysis of "On the Relativity of Lengths and Times"

Following the two postulates in his paper, Einstein launches into his first equation which is basic high school physics. It would appear that Einstein is attempting to establish from basic principles his theory of relativity, so much so, that he emphasizes it by quoting a valid equation in a literal form, suggesting that in some way this is the basis of his theory;

$$velocity = \frac{light\ path}{time\ interval} \qquad (2.00)$$

Everyone must surely recognize this equation for calculating velocity from distance and time which is universally accepted as valid and as proclaimed by Einstein in his first postulate must be equally valid in any frame of reference. After declaring the equation above, the very next pair of equations in the paper immediately begin with an erroneous and obviously invalid "suggestion";

$$t_B - t_A = \frac{r_{AB}}{c - v} \text{ and } t'_A - t_B = \frac{r_{AB}}{c + v} \qquad (2.01)$$

"where r_{AB} denotes the length of the moving rod..."

The problem lies not only in the validity of the equations themselves, but also the comment immediately following "*where r_{AB} denotes the length of the moving rod…"* which establishes the manner in which the equations should be interpreted. Einstein simply removes "*distance*" and replaces it with a completely different parameter of "*length*". No explanation is given as to why this is done and does not include any prior mathematical support requiring this change. This seemingly innocuous statement alters both equations and establishes a new proportionality which is clearly erroneous;

$$time\ interval = \frac{length}{velocity} \qquad (2.02)$$

From this point onwards due to this apparently simple change the exact opposite of what Einstein claims occurs, the faster an object travels the longer it gets, not shorter.

Taking the first of Einstein's own equations and also using the very model suggested by Einstein himself, actual values can be substituted into both equations. A model can be postulated that a rod of some arbitrary length begins at a certain position and travels for $2.99 * 10^8$ meters at a velocity of half the speed of light for two seconds. The rod then returns to the source travelling at half the speed of light $c/2$ once more for a further two seconds. As such a legitimate enquiry can then be made as to the length of the rod after the initial two seconds $(2s)$ on the first leg of the rods journey;

$$t_B - t_A = \frac{r_{AB}}{c - v} \qquad (2.03)$$

Therefore;

$$r_{AB} = -(v - c)\,(t_B - t_A) \qquad (2.04)$$

Substituting the prior values, results in;

$$r_{AB} = -(v - c)\,(t_B - t_A) = 2.99 * 10^8 \qquad (2.05)$$

Consequently, after completing the first leg of the journey the length of the rod has now become $2.99 * 10^8$ meters whereby the initial length appears somewhat unimportant.

The rod is then reflected and returns to the origin at A. Consequently, the final length of the rod upon completion of the second leg of the rods journey can also be calculated from the second equation of Einstein;

$$t'_A - t_B = \frac{r_{AB}}{c + v} \qquad (2.06)$$

Therefore;

$$r_{AB} = (t'_A - t_B)\,(v + c) = 8.97 * 10^8 \qquad (2.07)$$

The results are clear after travelling at half the speed of light for four seconds, the length of the rod has increased not decreased as is claimed by Einstein. The first leg of the journey resulted in an increase in length irrespective of its original length to $2.99 * 10^8$ meters and on the second leg of the journey back to the source increases once more to a value of $8.97 * 10^8$ meters, again irrespective of the intermediate or original length.

At this point it cannot be denied that length contraction has not occurred but rather length expansion which is in direct contradiction to the theory. As such "length dilation" becomes a much more descriptive term. In the context of Einstein's paper this first section results in an erroneous equation the he uses extensively throughout the paper;

$$v = \frac{1}{\sqrt{1 - v^2/c^2}} \qquad (2.08)$$

This equation is perhaps the most important one in Einstein's paper as it sets the stage for the remaining calculations. It is worthy of repeating that the foundation of this equation is;

$$time\ interval = \frac{length}{velocity} \qquad (2.09)$$

A literal translation of this equation is a calculation to determine the time it takes for an object to contract or expand whether it is rods, clocks or rays of light. It certainly cannot be construed to be an equation to calculate the time of travel, as distance is not one of the parameters in the equation. Due to this clearly erroneous definition by Einstein, the equation itself subsequently becomes synonymous with an equation to calculate the time it takes for a rod a clock or ray of light to stretch or contract not its travel time and is used extensively throughout Einstein's paper.

3. Analysis of "Theory of the Transformation of Co-ordinates and Times from a Stationary System to another System in Uniform Motion of Translation Relatively to the Former"

Einstein now embarks upon his derived form of Lorentz transformation which is suspect to say the least.

It should be noted from the title that Einstein is now talking about two frames of reference one stationary and a second. He also states that they are "*in Uniform Motion of Translation Relatively to the Former*" consequently, if one frame is stationary then both must be. There is a light ray in the second frame which starts at x but does not move from its starting position because x is always zero. Instead, for some reason its length changes. The question now becomes does the light ray stretch as shown in section 2 or does it contract. If it contracts as Einstein seems to believe, the light has not moved from its initial position in the x-axis which is always zero so it must simply disappear over time. Einstein then uses the speed it takes to shrink, to calculate the time taken to do so and from this establish what an observer in the original "stationary" frame actually sees. From his transformation Einstein then deduces that the observer actually sees the ray of light moving not shrinking. For some reason the ray of light in the second reference frame has now moved and the distance it has moved is the same as the amount it shrunk in the second reference frame. If the reader finds this confusing they are not alone, but this is an exact description of the transformation done by Einstein.

Einstein starts with an equation whereby a ray of light begins with only one reference frame at time zero τ_0 travels to a second point at τ_1 is reflected and returns to the origin at τ_2 the result being this simple equation which is correct;

$$\frac{1}{2}[\tau_0 + \tau_1] = \tau_2 \tag{3.00}$$

Before proceeding further, the first item on the list is to rectify the inconsistent use of τ, in the equation above Tao represents time, however in the very next equation it is no longer time but rather becomes a function which takes as its input four parameters subsequently returning a value. The ray of light in the second reference frame is not moving it stays fixed at $x = 0$ as it is its length x' that is changing;

$$\frac{1}{2}\left[\tau(0,0,0,t) + \tau\left(0,0,0,\frac{x'}{c-v} + \frac{x'}{c+v}\right)\right] = \tau\left(x',0,0,t + \frac{x'}{c-v}\right) \tag{3.01}$$

To simplify the interpretation of Einstein's paper, where appropriate τ can be replaced by the almost ubiquitous symbol in mathematics for a function f and the unused parameters for the y and z coordinates can be eliminated as they are unused throughout this particular equation. This results in a slightly more readable equation which can then be further simplified;

$$\frac{1}{2}\left[\boldsymbol{f}(0,t) + \boldsymbol{f}\left(0,\frac{x'}{c-v} + \frac{x'}{c+v}\right)\right] = \boldsymbol{f}\left(x',t + \frac{x'}{c-v}\right) \tag{3.02}$$

It can now be seen there are three functions shown in red which take certain parameters, as this particular function f is common throughout, the input parameters must also be of an identical type. Consequently from the equation the function can be represented as taking the simpler form of distance in the x-axis and time meaning that each function returns a velocity, as shown below;

$$f(x,t) = \text{velocity} \tag{3.03}$$

Furthermore, for easier analysis the functions in equation (3.02) can have their parameters removed temporarily and also be renamed numerically, the format of which is clearly identical to Einstein's original equation;

$$\frac{f_0 + f_1}{2} = f_2 \tag{3.04}$$

Now that the basic functions of the equation have been clarified each of these three functions f_0, f_1 and f_2 can be analyzed individually.

Beginning with the first function, $f_0(0,t)$, the x position in the x-axis is zero and because the second parameter contains t this suggests that the value returned by the function f_0 can be zero or alternatively an offset from the initial starting time of the experiment which would therefore be t . Clearly, Einstein is unsure of the value to be placed here, however there is only one possibility if this is to perform correctly as a function the return value must be a velocity which is either zero or c, the parameter t should be removed and replaced by zero unless time is offset by an arbitrary value which makes no sense. As such, the result of the function f_0 is considered to be nothing more than zero;

$$f_0 = 0 \tag{3.05}$$

The parameters of the next function f_1 certainly look a little strange;

$$\frac{f_1\left(\mathbf{0}, \frac{x'}{c-v} + \frac{x'}{c+v}\right)}{2} \tag{3.06}$$

If the value of the x coordinate is zero (being the first parameter in red) the ray of light has not moved, but time which is the second parameter of the function, has assumed some other value. Apparently, in this function the ray of light is still at position 0 on the x-axis in the stationary frame and in the other frame is also stationary, however the length of the ray of light x' is changing. The time it takes for the length of the light ray to change in f_1 is expressed by the combined equations which form the second parameter of the function;

$$\frac{Length\ of\ ray}{c - speed\ of\ ray} + \frac{length\ of\ ray}{c + speed\ of\ ray} \tag{3.07}$$

$$\frac{x'}{\mathbf{c-v}} + \frac{x'}{c+v} \tag{3.08}$$

Einstein does say however that x' (which is a length) is "*chosen to be infinitesimally small*" but then sets it to 1 anyway, remembering that this is a length in the second reference frame or does Einstein now think it is distance? The velocity of the ray of light v is also known, being a ray of light and not a rod it must have a velocity of c, replacing v with c results in;

$$\frac{1}{\mathbf{0}} + \frac{1}{2c} = t \tag{3.09}$$

This supposedly returns the time taken for a light ray to expand or contract. As the left-hand side is a division by zero it evaluates to undefined and as a consequence the complete equation also evaluates to undefined. At this point the solution to the original function below;

$$\frac{f_0 + f_1}{2} = f_2 \tag{3.10}$$

By inserting the values for f_0 *and* f_1 now becomes;

$$\frac{\mathbf{0} + \mathbf{undefined}}{2} = f_2 \tag{3.11}$$

And dividing by 2 results in;

$$\mathbf{undefined} = f_2 \tag{3.12}$$

Although somewhat pointless, in the interests of completeness the final function f_2 will also be analyzed which is seen to be;

$$f\left(\mathbf{x'}, t + \frac{x'}{\mathbf{c-v}}\right) \tag{3.13}$$

Einstein defines x' a length as being an infinitely small number but as said sets it to 1 anyway, signifying that x in the x-axis (the first parameter in red) is now the length of the light ray, neither of which are infinitely small values. The denominator $c - v$ comes from Einstein's original incorrect proportionality equation in section 2 that;

$$time = \frac{length}{velocity} \tag{3.14}$$

This supposedly represents the length of the light ray and because it is a still a light ray, assumedly it must travel at a constant velocity, in other words the speed of light therefore v must equal c and substituting these values into the function results in;

$$f\left(1, t + \frac{1}{\mathbf{0}}\right) \tag{3.15}$$

Yet again division by zero renders this last function undefined.

Finally, the solution to the complete transform of the original equation using all three functions;

$$\frac{f_0 + f_1}{2} = f_2 \tag{3.16}$$

Becomes;

$$\mathbf{undefined} = \mathbf{undefined}$$

Somewhat ironically, the equation actually balances as it is "undefined" on both sides, but contributes nothing of any value to Einstein's theory.

Proceeding with the reminder of this section it is found that Einstein decides to tackle the y and z dimensions and states that *"it being borne in mind that **light** is always propagated along these axes, when viewed from the stationary system at"*;

$$\sqrt{\mathbf{c^2 - v^2}} \tag{3.17}$$

Once more the velocity of the light ray v is still the speed of light c because it is exactly that, a light ray therefore the equation becomes;

$$\sqrt{c^2 - c^2} \text{ or } \sqrt{\mathbf{0}} \tag{3.18}$$

The square root of zero is zero; therefore Einstein is saying that a ray of light in the y and z axes will not be moving at all when viewed from the stationary system, however the question arises once more is he talking about length or distance. Einstein cannot possibly admit that the velocity of a light ray v is actually the speed of light as it results in a division by zero every time. Consequently, Einstein does a few more equations and finally arrives at the same conclusion that the velocity in both axes y and z is zero.

The next equation represents the result of a function of a function that is the same as another function that contains just one parameter". No, that is not a typo it is a function of a function the same as another function with one parameter! or;

$$\tau = a\left(t - \frac{v}{c^2 - v^2}x'\right) \tag{3.19}$$

Alternatively using the traditional symbol for a function f;

$$f_0 = f_1\left(t - \frac{v}{c^2 - v^2}x'\right) \tag{3.20}$$

Einstein also states that the result of that function of a function has the same value as yet another function;

$$a = \phi(v) \tag{3.21}$$

Or;

$$f_1 = f_2(v) \tag{3.22}$$

This clearly demonstrates that Einstein neither understands the purpose of mathematical functions nor has even the vaguest idea of their correct use. He specifically states that the function ϕ is an unknown function but in the same instance is equal to function a and as $a = \tau$, in reality all of the functions must be identical. Although this function of a function equaling another function is confusing, when it is looked at logically, Einstein already knows the function he is trying to determine ϕ as it can only be the original;

$$\phi\left(t - \frac{v}{\mathbf{c^2 - v^2}}x'\right) \tag{3.23}$$

It turns out that this juggling of functions is completely irrelevant anyway as the parameter contains a division by zero error yet again, as in the denominator the speed of a light ray v^2 is the speed of light so $v^2 = c^2$ as it still a light ray not a rod or a clock and light rays travel at the speed of light! Subtracting one from the other results in a denominator of zero once more producing a divide by zero error and an undefined expression;

$$t - \frac{v}{\mathbf{0}}1 \tag{3.24}$$

The remaining equations are simply made in preparation in for Einstein to determine the value of the function ϕ which he already knows and has just been shown to be undefined.

At this point Einstein returns from his excursion into light rays and returns once more to moving rods in an attempt to prove the constancy of the speed of light. It appears that the difference between light rays and rods makes little difference as the same undefined function ϕ is used yet again but this time in a different context not light rays but rods eventually deciding after doing some transformations that the *"value of the function"* is actually 1. Even the description itself is erroneous, what is really meant is that the function "returns" a value of 1 as functions do not have inherent values in and of themselves.

Forgetting the rods once more and turning back to rays of light, Einstein now creates a new frame of reference which represents the frame of an observer in order to calculate what this ray of light ray would look like when in motion. He starts with the equation;

$$\xi = c\tau \text{ or } \xi = ac\left(t - \frac{v}{\mathbf{c^2 - v^2}}x'\right) \tag{3.25}$$

The value of $\tau = 0$ when $t = 0$ so these values can be inserted into the equation, likewise as it is a ray of light the value of v^2 must be c^2.

$$\xi = c * 0 \text{ or } \xi = ac\left(0 - \frac{v}{\mathbf{0}}x'\right) \tag{3.26}$$

The result of this is that $\xi = 0$ or $\xi = \text{undefined}$ as it is again a division by zero. "*But the ray moves relatively to the initial point of k, when measured in the stationary system, with the velocity* $c - v$*, so that"*

$$\frac{x'}{\mathbf{c - v}} = t \tag{3.27}$$

Velocities have not changed, the value of v is still c and it is still a light ray, however the value of x' which is in the other reference frame must be the length of the ray of light not a distance. This once more produces a division by zero as it is still a ray of light, stretching or contracting at the speed of light;

$$\frac{x'}{\mathbf{0}} = t \tag{3.28}$$

Einstein then inserts this undefined value into the previous equation shown in (3.26);

$$\xi = a\mathbf{c}\left(t - \frac{\mathbf{v}}{c^2 - v^2}x'\right) \tag{3.29}$$

Resulting in not only a divide by zero error, but also a significant indication of Einstein's subterfuge;

$$\xi = a\frac{\mathbf{c^2}}{\mathbf{c^2 - v^2}}x' \tag{3.30}$$

The observant reader may wonder where did the c^2 in the numerator come from as it was originally v. The answer is that he moves c from outside of the brackets (3.29 in red) to the numerator and multiplies it by v resulting in c^2. By doing this, the trick has been exposed, as Einstein knows that the velocity v is actually c but neglects to change the v in the denominator. Just to be clear, these are the individual steps he takes;

$$\xi = a\mathbf{c}\left(t - \frac{v}{c^2 - v^2}x'\right)$$

$$\xi = a\left(t - \frac{v\mathbf{c}}{c^2 - v^2}x'\right)$$

$$\xi = a\left(t - \frac{\mathbf{c^2}}{c^2 - v^2}x'\right)$$

Einstein changed the v in the numerator to c but not the v in the denominator, why would this be, the reason is obvious;

$$\xi = a\left(t - \frac{\mathbf{c^2}}{c^2 - \mathbf{v^2}}x'\right)$$

$$\xi = a\left(t - \frac{\mathbf{c^2}}{\mathbf{0}}x'\right)$$

Division by zero, this proves without a shadow of doubt that Einstein is fully aware of the problem that exists with the expression $c^2 - v^2$ producing a fatal divide by zero error, but instead decides to hide the problem. In the meantime, the actual answer to the substitution is not only one but two, division by zero errors;

$$\xi = ac\left(\frac{x'}{\mathbf{0}} - \frac{vx'}{\mathbf{0}}\right) \tag{3.31}$$

After a further juggling of several more equations using his division by zero result in (3.25) he finally somehow arrives at;

$$\beta = \frac{1}{\sqrt{1 - v^2/c^2}} \tag{3.32}$$

Even his final equation is incorrect as if applied to light rays which always travel at the speed of light an identical erroneous result is always the result because the value of $v^2 = c^2$ exactly as Einstein has shown previously;

$$\beta = \frac{1}{\mathbf{\sqrt{0}}} \tag{3.33}$$

The square root of zero is zero which is again a divide by zero error. So Einstein has finally achieved what he set out to do and find the value of β which he believes is;

$$\beta = \frac{1}{\sqrt{1 - v^2/c^2}} \tag{3.34}$$

When in reality it is;

$$\beta = \mathbf{undefined} \tag{3.35}$$

4. Analysis of "Physical Meaning of the Equations Obtained in Respect to Moving Rigid Bodies and Moving Clocks"

In the previous section Einstein believes he has shown that the speed of light is constant and has sewn the seed that the length of rods contract when they move. The purpose of this section is for Einstein to confirm that rods contract or time dilates by using strategically placed clocks and moving rods.

Einstein states *"We envisage a rigid sphere of radius R, at rest relatively to the moving system k"*, he then presents an equation that represents a sphere;

$$\frac{x^2}{\left(\mathbf{\sqrt{1 - v^2/c^2}}\right)^2} + y^2 + z^2 = R^2 \tag{4.00}$$

Of course it can easily be seen that the equation carried from the previous section produces a divide by zero error.

$$\frac{x^2}{\left(\sqrt{\mathbf{0}}\right)^{\mathbf{2}}} + y^2 + z^2 = R^2 \tag{4.01}$$

$$\mathbf{Undefined} + y^2 + z^2 = R^2 \tag{4.02}$$

Although the paper at this point is clearly beyond recovery having come this far, it was thought prudent to continue the analysis. The very next equation is simply a statement totally unconnected with the aforementioned Pythagorean equation;

$$R\sqrt{1 - v^2/c^2}, R, R \tag{4.03}$$

It is not an equation there is no equals sign it is simply a statement of three values, that of;

$$x, y, z \tag{4.04}$$

Einstein now places clocks in various positions obviously attempting to show that there will be some difference in time. He then states "*Further, we imagine one of the clocks which are qualified to mark the time t when at rest relatively to the stationary system, and the time τ when at rest relatively to the moving system, to be located at the origin of the co-ordinates of k, and so adjusted that it marks the time τ. What is the rate of this clock, when viewed from the stationary system?* "

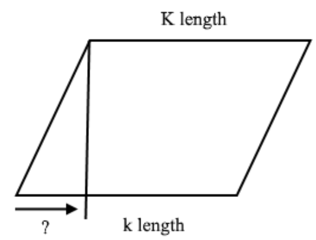
First of all the only system k that is mentioned must be the one with the solid ball, the *"rigid sphere"* that Einstein has just created as he does not mention a new system. Consequently, removing the extraneous wordiness from the statement, what Einstein is suggesting is that;

- The first clock records the time when it is not moving and a second clock next to the ball also records the time.
- The ball and the clock both move and Einstein then asks what would be the rate of the clock moving with the ball as seen someone sitting by the stationary clock?

Considering that up to this point almost every equation has resulted in undefined, it is tempting to assume that maybe the clocks actually do read the same time. It can be assumed that it is now a ball or even a rod that is moving and not a ray of light as such. It should be noted that the x parameter up to this point has been derived exclusively using a ray of light which has consistently produced an undefined result. There exists absolutely nothing in the paper that would suggest that this erroneous result would also apply to balls and rods. A second problem is what Einstein is actually asking for is an opinion "*what would be rate of the clock*". As such the answer should be that lacking any mathematical or observational support, the clocks would indeed show the same time as there is nothing to suggest otherwise.

5. Summary of "Composition of Velocities"

In this section Einstein attempts to prove mathematically that the speed of light is a limit. So what is his plan? It is quite simple, setup two systems one has a moving point in it and find out how long it looks from the other system, something like this;



It should be remembered of course that Einstein surreptitiously replaced distance with length in the first section, so what he will be calculating from his equations is not really a distance it is a length.

He first establishes another system which he calls "K" which he is about to compare with the first system "k" which appears to come from the previous section, the one with the ball. Einstein's statement "*In the system k moving along the axis of X of the system K with velocity v, let a point move in accordance with the equations*", could be better explained what is actually meant is "looking from the system k" at a point moving in "K".

$$\begin{gathered} \xi = \omega_\xi \tau, \\ \eta = \omega_\eta \tau, \\ \zeta = 0 \end{gathered} \tag{5.00}$$

"Where ω_ξ and ω_η denote constants"

If the Greek symbols are ignored the equation below is actually the variables $x, y\ and\ z$. The simple question is why constants and what value, the only answer is the speed of light because these constants represent a velocity and the only constant velocity is "c" therefore his equation is;

$$\begin{gathered} x = ct, \\ y = ct, \\ z = 0 \end{gathered} \tag{5.01}$$

This of course assumes that the value of Tao in this case represents time and is a correct representation. Solving Einstein's equations gives;

$$x = \frac{\omega_\xi + v}{1 + \frac{v\omega_\xi}{c^2}} t \tag{5.02}$$

$$y = \frac{\sqrt{1 - v^2/c^2}}{1 + v\omega_\xi/c^2} \omega_\eta t$$

$$z = 0$$

The value of v can be substituted with c resulting in;

$$x = \frac{c + v}{2} t = ct \tag{5.03}$$

$$y = \frac{\sqrt{1 - v^2/c^2}}{1 + v/c} ct$$

$$z = 0$$

Which when simplified becomes;

$$x = \frac{c + v}{2} t = ct$$

$$y = \frac{\sqrt{1 - v^2/c^2}\ (c^2 t)}{v + c} \quad (5.03)$$

$$z = 0$$

In this particular case the moving object is not a ray of light it may be a clock, rod or even a ball, as such the velocity is not known and remains as v. However by using the equations Einstein developed previously for light rays he is comparing distances to lengths, apples to oranges.

There is however little point in going further with these values as their only purpose is for Einstein to insert into his erroneous transformations, in an attempt to prove that there are differences in lengths or is it distances, between the two systems. As in section 3 the transformation has been proven to be invalid the result of which being;

$$\textbf{undefined} = \textbf{undefined}$$

By assuming that there is a difference in lengths or distances, this results in a parallelogram as shown in the previous graphic. As there is no parallelogram because the transformation equation is erroneous there is no need to perform the calculations to get the angle and the difference in lengths or distances is indeed zero, as they are in reality both of the same value.

6. Analysis of "Transformation of the Maxwell-Hertz Equations for Empty Space. On the Nature of the Electromotive Forces Occurring in a Magnetic Field During Motion"

The first equations in this section are the symmetric Maxwell Hertz equations that connect the magnetic with the electric force. Einstein proposes using a transform with his errant transformation equation derived earlier including his equally incorrect equation for rays of light;

$$\beta = \frac{1}{\sqrt{1 - v^2/c^2}} \quad (6.00)$$

This equation however has already been proven incorrect, due to the errors in transformation and also the divide by zero errors as shown in section 3. Even Einstein's equation itself looks dubious when used to describe a light ray;

$$\beta = \frac{1}{\sqrt{1 - c^2/c^2}} = t$$

$$\beta = \frac{1}{\sqrt{\mathbf{0}}} = t \quad (6.01)$$

Ignoring the errors, there is absolutely no reason to assume that the equation can be equally applied to magnetic and electric fields in which the velocity may indeed be less than c as the equation was derived using light rays, applying it to magnetic and electric fields does not make it correct. As such there is no recourse but to assume that this complete section is also erroneous.

7. Analysis of "Theory of Doppler's Principle and of Aberration"

It should be made clear from the start that this section deals exclusively with electromagnetic waves which travel at the speed of light. Einstein imagines the transmission of light from a distant source and uses once more the errant transformation equation to suggest a change in frequency of the electromagnetic wave.

Einstein states however "*When $\phi = 0$ the equation assumes the perspicuous form*";

$$v' = v\frac{1 - v/c}{1 + v/c} \quad (7.00)$$

Once more the symbol for frequency can be changed to f to avoid confusion;

$$f' = f\frac{1 - v/c}{1 + v/c} \quad (7.01)$$

What Einstein is suggesting is that the frequency of a reflected wave is predicted by this equation. Of course it is an electromagnetic wave which means it must travel at the speed of light, therefore;

$$f' = f\frac{\mathbf{0}}{2} = \mathbf{0} \quad (7.02)$$

The frequency of f' becomes zero! From this it must be decided whether or not a reflected electromagnetic wave has or appears to have a velocity different to the speed of light. It may be assumed that if indeed the frequency of a reflected electromagnetic wave is zero then all that is understood about the transmission of electromagnetic radiation is completely wrong and everything from Wi-Fi to television should not work. The relationship between velocity and frequency is well known and is certainly not open to negotiation as almost all of the technology of modern life is based upon this single equation;

$$f = \frac{v}{\lambda} \quad (7.03)$$

In this particular instance there is also empirical evidence that Einstein is mistaken and is tested with equipment millions of times daily by amateur radio enthusiasts based upon the equation above. The overall principle is quite simple. It is not immediately obvious that amateur radio is very often bounced off the ionosphere of the Earth and reflected back to the receiver, exactly the situation that Einstein proposes. This is also exactly the same range and conditions as Muons whose decay is calculated and supposedly explained by Einstein's equations. The amateur radio example must therefore be considered a valid alternative being directly equivalent to the Muon decay explanation.

Average amateur radio transmission frequency is around $1.44 * 10^8$hz with accuracies easily achieved by modern receivers and transmitters acceptable to enthusiasts of around 7hz with equipment being synchronized to atomic time. This places a strict limit on Einstein's theory in the change of the frequency of reflected electromagnetic waves of no greater than $5 * 10^{-8}$hz. Consequently, using Einstein's suggested equation the frequency variation can be calculated;

$$f' = f \frac{1 - v/c}{1 + v/c} \quad (7.04)$$

Assuming that the velocity is 0.999c this gives a variation in frequency of the reflected wave according to Einstein in the region of $5 * 10^{-4}$hz. By comparison, the accuracy of the average amateur radio equipment when measuring a change in frequency is in the range of $5 * 10^{-8}$hz or four orders of magnitude more accurate than that required in measuring the change predicted by Einstein.

It is inconceivable that the amateur radio enthusiasts would not notice frequencies being off by 10,000 times, especially when they go to the trouble of synchronizing their equipment to atomic clocks. The only possible explanation is that Einstein is incorrect in his prediction that electromagnetic waves change in frequency with velocity.

8. Analysis of "Transformation of the Energy of Light Rays. Theory of the Pressure of Radiation Exerted on Perfect Reflectors"

The next section in Einstein's paper is that related to energy and his first assumption is that the unit volume of light can be expressed as;

$$\frac{A^2}{8\pi} \quad (8.00)$$

This subject is somewhat controversial and it is considered that the equation is a naïve interpretation of the actual Poynting effect as such this section will not be analyzed.

9. Analysis of "Transformation of the Maxwell-Hertz Equations when Convection-Currents are Taken into Account"

Einstein starts with the Maxwell Hertz equations and assumes that the electric charges are actually particles and concludes that the equations are a representation of the velocity of electric charge. He then applies these velocities to his transformation and subsequently gets the same result as for light rays in the previous section 5. Einstein then concludes that this is validation of the transformations and also the composition of velocities in section 5.

This of course is incorrect as in reality all that Einstein has done is repeat the first sections of his paper but instead of using the velocity of light rays, rods or clocks he now uses the velocity of charge. Considering that his original calculations obtained results when there were none, it is unsurprising that a subsequent calculation using different initial velocities would also produce equations when there were none.

10. Analysis of "Dynamics of the Slowly Accelerated Electron"

In this final section of Einstein's paper he creates two frames of reference into one of which he places an electron. Then he states that the position and time of this electron in both frames of reference are essentially identical at zero "*If, further, we decide that when* $t = x = y = z = 0$ *then* $\tau = \xi = \eta = \varsigma = 0$". Einstein states that his transformation would still be valid under these conditions and subsequently proceeds to use his transformation on the electron. It should be made absolutely clear that the inputs into Einstein's transformation are all exactly zero and yet he still obtains a result of;

$$\text{Longitudinal mass} = \frac{m}{\left(\sqrt{1 - v^2/c^2}\right)^3} \quad (10.00)$$

$$\text{Transverse mass} = \frac{m}{1 - v^2/c^2} \quad (10.01)$$

To even a person of average intellect this would seem strange that it seems to make little difference what values are used for the input even zero's and that the result always returns the same equation. This coincidence is clear from the equation above whose only difference from section 2 is that the numerator and the result is now a mass, where previously it was a length and a time.

The incredulity of this can easily be shown if it is imagined as an equation machine;

- If zero is input
  The result is an equation for mass.
- If a light ray is input
  The result is for velocity
- If rods are input
  The result is an equation for length.

Clearly, this does not show that the theory has produced a universal procedure that seems to apply to everything, it shows that no matter what the input is, it can be manipulated to produce exactly the expected output.

The final part of this section Einstein purports to derive the equation;

$$\mathrm{e} = mc^2 \quad (10.02)$$

The first thing he does is to state that the electron does not emit any energy when it is accelerated "*and consequently may not give off any energy in the form of radiation*," thereby directly paving the way for;

$$\text{kinetic energy} = \text{potential energy} \quad (10.03)$$

The next comment is "*the energy withdrawn from the electrostatic field must be put down as equal to the energy of motion W of the electron*", which is nothing new it simply describes the conversion from kinetic energy to potential energy which even the Greeks had an inkling of back in 500BC, in essence Einstein is quoting an already acknowledged fact, however his greatest challenge now is to link it to his equation machine to produce the expected result. The equation he uses to perform the task is his tried and tested equation;

$$W = mc^2\left(\frac{1}{\sqrt{1 - v^2/c^2}}\right) \quad (10.04)$$

After quoting this Einstein states "*Thus, when $v = c$, W becomes infinite.*" Of course readers of this paper will immediately recognize this statement which has been repeated many times throughout. Therefore for one last time, only this time with Einstein's approval;

$$\frac{1}{\sqrt{1 - v^2/c^2}} \quad (10.05)$$

Setting $v = c$ results in;

$$\frac{1}{\sqrt{\mathbf{0}}} \quad (10.06)$$

Yes, again a division by zero error. In this last section of Einstein's paper and having finally admitted that all that has been said throughout this paper concerning $v = c$ is actually correct, Einstein makes his final blunder by proclaiming that $1/0$ is infinity when in actual fact it is simply undefined. Einstein then uses his final mathematical error to claim that when $v = c$ energy approaches infinity, leading to;

$$\mathrm{e} = mc^2 \quad (10.07)$$

What is obvious from Einstein's equation is that of course it results in infinity, multiplying anything by infinity always results in infinity. Any number or equation whatsoever can be inserted into the equation and it would still result in infinity.

Summary and Conclusions

What has been learned from this analysis? The mathematical errors presented in this paper are based entirely upon Einstein's own equations and statements. In fact it is possible to go to the very last statements in the paper where Einstein essentially admits, in his own words the very errors presented. From this alone it is blatantly obvious that he was aware of the failures of his theory but made every effort to obfuscate them. In spite of this the author is certain that the advocates of Einstein will either ignore the errors or simply gloss over them as Einstein appears to have created the ultimate tool for theoretical physicists. His paper suggests that length contracts, time dilates and things do not necessarily appear the same to different observers. In fact it is a catch all solution, if length can be shown to not be contracting then it must be time that is dilating, if time can be shown to not dilate it must be the wrong frame of reference and finally, which frame of reference is the correct one to use, anyone which agrees with the expected result. In essence Einstein's theory can produce almost any solution required from any situation.

11. References

[i] *https://www.fourmilab.ch/etexts/einstein/specrel/www/#tex2html8*