Refutation of The Length Contraction And Time Dilation Conclusions of Einstein's Special Theory Of Relativity
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1.0 Introduction

This paper presents a refutation of the length contraction and time dilation conclusions of Einstein's special theory of relativity by a new mathematical method. The method relies upon a procedure called evaluation, which is essentially the same as used in the evaluation of an equation given a specified condition of evaluation. A crude and poorly defined non-rigorous method of evaluation was used by Einstein in his fundamental papers to determine the “physical meaning” of the Lorentz transforms “in respect to moving rigid bodies and moving clocks”. In this paper, the method of evaluation is rigorously applied to the same problem. The results obtained from the new approach to the evaluation of the Lorentz transforms, shows that the solutions are inconsistent with the traditional equations and conclusions obtained by Einstein and propagated by physics textbooks.

2.0 Background

In 1962 the late Herbert Dingle published his first refutation of Einstein’s special theory of relativity\(^1\). Many years later, he published a book titled Science At The Crossroads\(^2\) which presents clearly why the special theory is untenable. The significance of Dingle’s results have been obscured by polemics launched by opponents who have obscured the issues and asserted without a really good proof that Dingle’s refutation is incorrect\(^3,4,5,6\). However, these claims have never addressed the fundamental inconsistencies at the heart of the theory. Dingle’s refutation stands, although few scientists are aware of its existence.

This paper is the result of a analysis undertaken to study and understand the debate. It depends upon a new approach to demonstrating the inconsistencies and contradictions in the special theory of relativity. At the end, the reader will understand why it is successful. Dingle had already shown the theory was untenable in 1962. Therefore, as the years go by, it is not surprising that new refutations are produced. These will progressively become better, stronger, and more convincing as the faults inherent to the theory become better understood.

2.1 What Is Relativity?

The theory of relativity is a controversial topic largely because it is a diverse and confusing subject. The confusion is deepened by the fact that the theory as currently understood is not a single coherent theory, but a diverse collection of theories
integrated into a package which is taught in textbooks. Different theories appear in
different levels of textbooks. Introductory books try to keep the theory simple and
closely follow the historical development and stress Einstein’s 1905 version of relativity\(^7\) while giving the student an introduction to the more challenging methods of the
Minkowski space-time approach. Higher level books begin with the Minkowski\(^8\) approach and present Einstein’s 1907/1910 version\(^9,10\) in a more elegant form. The
student is unaware that there are significant differences between these different
interpretations that are inconsistent.

Most textbooks present the Einstein version of relativity which has largely superceded
the earlier versions of relativity pioneered by FitzGerald, Lorentz, Poincare, and Ives\(^11\). The theory is presented as if it is the creation of Einstein exclusively. But, Einstein
incorporated these earlier versions into his theory\(^9,10\). He changed the theory with each
new publication of a paper\(^7,9,10\). Following the introduction by Minkowski of a four
dimensional geometry now called space-time, the theory was radically altered in form
and content. The problem for the critic of relativity is to determine the correct accepted
version of relativity that is to be criticized. However, no single accepted definitive theory
is defined as the true theory of relativity.

In this paper, the problems and confusions inherent in the different versions of relativity
are bypassed by going directly to Einstein’s fundamental relativity papers of 1905, 1907
and 1910. In addition early textbooks and expositions on Einstein’s special relativity will
be examined to see how Einstein’s errors were propagated and new errors and
confusion were created because of misunderstandings and errors of interpretation by
the textbook writers.

### 2.2 Experiments and Relativity

The interpretation of the experimental evidence in the theory of relativity is another
major problem. Proponents of the theory seem obvious to the fact that the experimental
evidence is confusing and contradictory. This reinforces the problem of the different
theories of relativity which exist under the umbrella concept of relativity. Einstein’s 1905
version of relativity, which is closer to the Lorentz theory of relativity than the modern
version of relativity, asserts that moving clocks run slow and that distances contract.
The 1907 version, which was formulated to explain the redshift of moving canal rays,
asserts that the Lorentz contraction is real, but that the slowing of clocks is apparent.
The accepted explanation of the twins paradox is that the traveling twin ages slower
than his stay at home twin because the slowing of time in his reference frame is real. In
the explanation as to why the effect is not reciprocal as required by Einstein’s 1905
theory of relativity, the answer is given that the fast moving twin experiences
acceleration relative to the inertial reference frame of space while the stay at home twin
does not. Here the explanation relies upon space as an absolute frame of reference,
which contradicts the relativity postulate. The experiments which claim to support asymmetrical aging in the twins paradox, i.e. mu meson and traveling clocks, therefore refute the relativity postulate, and are inconsistent with Einstein’s 1907 version of relativity but consistent with Lorentz’s version.

All of the experiments are claimed to support Einstein relativity, but which version of relativity do they confirm? Since there are at least five versions of Einstein relativity (the 1905 version, the 1907 version, the 1910 version, the 1916 version of general relativity, and the Minkowski version) we need to know which experiments confirm which version of the theory. Furthermore, some experiments are inconsistent with Einstein relativity, and consistent with Lorentz relativity, while others appear to contradict Lorentz relativity. But the answer is only that the experiments confirm relativity. Which relativity do they mean? It is clear that we can not rely upon the experiments to guide us towards the truth in relativity. Therefore, a careful examination of the mathematics at the foundation of the theory is required.

3.0 Method Of Approach

Here the method used is significantly different from the usual approach which follows the method of Einstein. That approach is based on philosophical postulates and attempts to derive physical consequences based on mathematical deductions from the postulates. Here we take a different route. We assume as axioms the truth of the Lorentz transforms; i.e., we take the Lorentz transforms as the axioms, and then solve for the transformations of length and time by the new procedure of evaluation. The solutions obtained are then compared with the traditional solutions and the results analyzed.

The procedure will be to evaluate the Lorentz transforms first. These solutions will be explained and compared with the traditional solutions. This will be followed by an analysis of the basic problem of evaluation, and the different methods that can be applied to the solution. The purpose of this discussion is to show how many of the pitfalls and errors of the traditional methods, which were blindly used without rigorous method or clear understanding of the problem, have led to incorrect solutions. Fundamentally, the primary claim of this paper is that this is the first rigorously correct solution of the problem of evaluation, as applied to the problem of the physical meaning of the Lorentz transforms.

4.0 Mathematical Analysis

The mathematical method used here is to first solve the system of Lorentz and inverse Lorentz equations for space and time simultaneously using a specified condition of evaluation. Here the term evaluation is used in the same sense as it is used when a
polynomial equation is solved for its roots by setting the equation to equal zero and solving for the indeterminates. The procedure used here is similar. A selected variable is set to zero, and the resulting solutions are obtained. Solutions are obtained by setting one of the following four variables equal to zero, and then solving for the remaining three. The following variables are set equal to zero and the resulting solutions obtained by evaluation: \( x = x' = t = t' = 0 \), each taken in turn.

The Lorentz transformation equations in a simplified form are assumed as follows:

\[
\begin{align*}
  x' &= \beta (x - vt) \\
  t' &= \beta (t - vx/c^2) \\
  x &= \beta (x' + vt') \\
  t &= \beta (t' + vx/c^2)
\end{align*}
\]

Here there are four equations which express the simultaneous solutions for the transformation of coordinates. These equations are defined in the usual way in terms of two relatively moving reference frames \( S \) and \( S' \). Where the origin of frame \( S' \) is in motion with velocity \( v \) in the positive \( x \) direction of \( S \).

Notice that \( \beta \) is greater than unity when \( v \) is greater than zero, and that \( \beta^{-1} \) is less than unity when \( v \) is greater than zero. An equation of the form \( t' = \beta t \) results in a dilation of the variable \( t' \) with respect to \( t \) because \( t' \) is greater than \( t \). The equation \( t = \beta^{-1} t' \) results in a contraction of the variable \( t \) with respect to \( t' \) because \( t \) is less than \( t' \). The definition of \( \beta \) implies that it is always equal to or greater than unity, and can never be less than unity.

The coordinate frames \( S \) and \( S' \) are assumed to be orthogonal coordinate systems with the requirement that time is defined such that \( t = t' = 0 \) occurs when the origins coincide; i.e. \( x = x' = y' = z' = 0 \) at \( t = t' = 0 \). The axes for the \( x \), \( y \), and \( z \) directions are assumed to be parallel, and the \( y \) and \( z \) coordinates are assumed to be identical and coincide when the origins coincide at \( t = t' = 0 \). The purpose of the solutions is to determine the relations governing the transformation of the \( x \) and \( t \) coordinates according to the Lorentz transform equations.

### 4.1 Results for \( x = 0 \) (Specification of an evaluation in space)

To consider the role of evaluation in space, we determine the simultaneous solution of the four equations when we specify the condition that \( x = 0 \). The results are as follows:

- **Equation 1:** \( x' = \beta (x - vt) = -\beta vt \)
- **Equation 2:** \( t' = \beta (t - vx/c^2) = \beta t \)
- **Equation 3:** \( x = \beta (x' + vt') \) , Therefore \( x' = -vt' \)
- **Equation 4:** \( t = \beta (t' + vx/c^2) = \beta t' (1 - v^2/c^2) = \beta^{-1} t' \)

Notice that equation 4 is the inverse of equation 2, so they are the same solution. Equation 4 is solved by substitution with the result from equation 3. Therefore, from equations 2 and 4 we have the following solution for the condition \( x = 0 \): \( t' = \beta t \). The solutions for equations 1 and 3 give the results \( x' = -\beta vt = -vt' \), from which we conclude that
t' = βt. A result which is the same as obtained from equation 2 which is the primary result for the condition x=0.

4.2 Results for x' = 0 (Specification of an evaluation in space)

To consider the role of evaluation in space, we determine the simultaneous solution of the four equations when we specify the condition that x' = 0. The results are obtained as follows:

Equation 5: \( x' = \beta(x-vt) = 0 \), Hence \( x = vt \)

Equation 6: \( t' = \beta(t-vx/c^2) = \beta t(1-v^2/c^2) = \beta t' \)

Equation 7: \( x = \beta(x' + vt') = \beta vt' \)

Equation 8: \( t = \beta(t' + vx'/c^2) = \beta t' \).

Notice that equation 6 is the inverse of equation 8, so they are the same solution. Equation 6 is solved by substitution with the result from equation 5. Therefore, from equations 6 and 8 we have the following solution for the condition x' = 0: \( t = \beta t' \). The solutions for equations 5 and 7 give the results \( x = vt = \beta vt' \), from which we conclude that \( t = \beta t' \). A result which is the same as obtained from equation 8 which is the primary result for the condition x' = 0.

4.3 Results for t = 0 (Specification of an evaluation in time)

To complete the analysis of evaluation, we now consider the role of evaluation in time. We determine the simultaneous solution of the four equations when we specify the condition that t = 0. The results are as follows:

Equation 9: \( x' = \beta(x-vt) = \beta x \)

Equation 10: \( t' = \beta(t-vx/c^2) = -\beta vx/c^2 \)

Equation 11: \( x = \beta(x' + vt') = \beta x(1-v^2/c^2) = \beta^{-1} x' \)

Equation 12: \( t = \beta(t' + vx'/c^2) = 0 \), therefore \( t' = -vx'/c^2 \).

Notice that equation 11 is the inverse of equation 9, so they are the same solution. Equation 11 is solved by substitution with the result from equation 12. From equations 9 and 11, we have the following solution for the condition that t = 0: \( x' = \beta x \). The solutions for equations 10 and 12 give the results \( t' = -vx/c^2 = -vx'/c^2 \) from which we conclude that \( x' = \beta x \). A result which is the same as obtained from equation 9 which is the primary result for the condition t = 0.

4.4 Results for t' = 0 (Specification of an evaluation in time)

To consider the role of evaluation with the opposite condition, we determine the simultaneous solution of the four equations when we specify the condition that t' = 0. The
results are as follows:
Equation 13: \( x' = \beta(x - vt) = \beta x (1 - v^2/c^2) = \beta^{-1} x \)
Equation 14: \( t' = \beta(t - vx/c^2) = 0 \), therefore \( t = vx/c^2 \).
Equation 15: \( x = \beta(x' + vt') = \beta x' \)
Equation 16: \( t = \beta(t' + vx'/c^2) = \beta vx'/c^2 \).

Notice that equation 13 is the inverse of equation 15, so they are the same solution. Equation 13 is solved by substitution with the result from equation 14. From equations 13 and 15 we have the following solution for the condition that \( t' = 0 \): \( x = \beta x' \). The solutions for equations 14 and 16 give the results \( t = \beta vx'/c^2 = vx/c^2 \) from which we conclude that \( x = \beta x' \). A result which is the same as obtained from equation 15 which is the primary result for the condition \( t' = 0 \).

4.5 Comments on Above Results

The solutions presented as Equations 2 and 8 obtained with the evaluations \( x = 0 \), and \( x' = 0 \) correspond to the usually accepted reciprocally related equations which demonstrate time dilation for moving clocks in the special theory of relativity. These results lead to the commonly used description that moving clocks run slow. Equation 5 was used by Einstein in 1905 to deduce the result in equation 6 as time dilation. In 1910 Einstein revised his method and obtained the equation for time dilation as equation 8. Later authors cited equation 8 as the equation for time dilation. During the 1930s, some textbooks cited equation 2, and since then either equation 2 or 8, and sometimes both, have been used as the definition of time dilation. However, most textbooks continue to specify equation 8 as time dilation. Sometimes the inverse solutions given by equations 4 and 6 are referred to as equations for time dilation, but they are not generally or widely accepted as defining this concept. Notice that Einstein deduces time dilation using evaluation in frame \( S' \) by setting \( x' = 0 \).

The solutions for \( t = 0 \) and \( t' = 0 \), given in equations 9 and 15, do not lead to the usually accepted reciprocally related solutions for FitzGerald-Lorentz contraction in the special theory of relativity. Instead, the inverse solutions given in equations 11 and 13 are given as the traditional solutions for the Lorentz-FitzGerald contraction. This leads to the commonly used description that moving objects physically contract in the direction of motion. Einstein obtained the result given by equation 11 in his 1905 paper. The primary solutions given by equations 9 and 15, do not appear as solutions in the special theory of relativity. Notice that Einstein deduces the FitzGerald-Lorentz contraction using evaluation in frame \( S \) by setting \( t = 0 \). An evaluation procedure that is opposite to the evaluation used for the derivation of time dilation. In other words, time is evaluated in frame \( S' \) while space is evaluated in frame \( S \). These results lead to the commonly used description in special relativity that in a moving frame of reference space contracts and time dilates.
The method used here provides the traditional results in a very simple and efficient manner. But notice that there are additional equations which the traditional theory does not obtain. These results show that solutions obtained by the traditional methods are not complete. Equations 1, 7, 12, and 16 appear here for the first time. In addition, this is the first time that a fully complete solution set of all possible solutions has been obtained.

To summarize, when an evaluation condition is imposed upon the system of Lorentz transformation equations, two simultaneous solutions result. One solution, which we call the primary result, and its inverse, which we call the secondary result. The primary results appear in equations 2, 8, 9, and 15, with the secondary results given by equations 4, 6, 11, and 13. The primary results always give a dilation of the transformed variable while the secondary result is always a contraction. The primary result is distinguished from the secondary because it is also obtained as a solution of the remaining two equations which are redundant with the result of the primary solution. The primary equation is considered the solution because the secondary solutions are inversely related to the primary.

The following primary solutions are therefore interpreted as the solutions for the four evaluation conditions. They are as follows:
For evaluation x=0, the solution is equation 2: x’=βx.
For evaluation x’=0, the solution is equation 8: x=βx’.
For evaluation t=0, the solution is equation 9: t’=βt.
For evaluation t’=0, the solution is equation 15: t=βt’.
Notice that none of these solutions is a contraction, they are all dilations of coordinates.

4.6 Discussion Regarding the Interpretation and Meaning of The Results

Consider the case of evaluation with x=0. There are four resulting equations which have the following interpretation. Equation 3 gives the equation for the motion of the origin of the coordinate system S, the coordinate x=0, in terms of the time and space coordinates of S’. It represents the equation of motion obtained by an observer in S’ in terms of his coordinates. Equation 1 gives the motion of the origin of S relative to space in S’ in terms of time defined in system S. Thus, an observer in S can calculate his position in S’ using this equation and a clock at rest in S. An observer in S’ measures the motion of the origin of S in terms of his space coordinates using a clock at rest in S’ that records time in terms of t’. From the point of view of the observer in S using time t, the coordinates measured by an observer in S’ using time t’ are dilated in terms of the time measured in frame S. This is the result indicated by equation 2, the primary solution. The secondary solution given by equation 4 specifies how measurements of time performed in frame S’ are transformed back to the time standard of frame S.
Consider the case of evaluation with $x' = 0$. There are four resulting equations which have the following interpretation. Equation 7 gives the equation for the motion of the origin of the coordinate system $S'$, the coordinate $x' = 0$, in terms of the time and space coordinates of $S$. It represents the equation of motion obtained by an observer in $S$ in terms of his coordinates. Equation 5 gives the motion of the origin of $S'$ relative to space in $S$ in terms of time defined in system $S'$. Thus, an observer in $S'$ can calculate his position in $S$ using this equation and a clock at rest in $S'$. An observer in $S$ measures the motion of the origin of $S'$ in terms of his space coordinates using a clock at rest in $S$ that records time in terms of $t$. From the point of view of the observer in $S'$ using time $t'$, the coordinates measured by an observer in $S$ using time $t$ are dilated in terms of the time measured in frame $S'$. This is the result indicated by equation 8, the primary solution. The secondary solution given by equation 6 specifies how measurements of time performed in frame $S$ are transformed back to the time standard of frame $S'$.

When we consider the meaning of the system of equations for evaluation specified by a time, we are considering the concept dual to the meaning of the motion of the origin in space. This dual concept is the equation of synchronization of time. The equation gives the time lead or lag of a clock at a space coordinate relative to a clock located at the origin of space coordinates. The equation specifies the time measured at a space coordinate when the clock at the origin reads zero time.

Consider the case of evaluation with $t = 0$. There are four resulting equations which have the following interpretation. Equation 12 gives the equation for the synchronization of the clocks in coordinate system $S'$ in terms of the time and space coordinates of $S'$. It represents the equation of synchronization for an observer in $S'$ in terms of his space coordinates. Equation 10 gives the equation of synchronization of time in $S'$ relative to space coordinates defined in $S$. Thus, an observer in $S$ can calculate his time lag relative to the clocks in $S'$ using this equation and his location in $S$. From the point of view of the observer in $S$ using distance $x$, the coordinates measured by an observer in $S'$ using distance $x'$ are dilated in terms of the distances measured in frame $S$. This is the result indicated by equation 9, the primary solution. The secondary solution, given by equation 11 and usually called the Lorentz-FitzGerald contraction, specifies how measurements of distance performed in frame $S'$ are transformed back to the distance standard of frame $S$.

Consider the case of evaluation with $t' = 0$. There are four resulting equations which have the following interpretation. Equation 14 gives the equation for the synchronization of the clocks in coordinate system $S$ in terms of the time and space coordinates of $S$. It represents the equation of synchronization for an observer in $S$ in terms of his space coordinates. Equation 16 gives the equation of synchronization of time in $S$ relative to space coordinates defined in $S'$. Thus, an observer in $S'$ can calculate his time lag
relative to the clocks in $S$ using this equation and his location in $S'$. From the point of view of the observer in $S'$ using distance $x'$, the coordinates measured by an observer in $S$ using distance $x$ are dilated in terms of the distances measured in frame $S'$. This is the result indicated by equation 15, the primary solution. The secondary solution, given by equation 13 and usually called the Lorentz-FitzGerald contraction, specifies how measurements of distance performed in frame $S$ are transformed back to the distance standard of frame $S'$.

5.0 The Mathematical Concept of Evaluation

The purpose of this section is to discuss the critical notion of evaluation as it is used in the transformation of spatial and temporal intervals in Einstein’s special relativity. Evaluation is an important part of the methods used in special relativity which lead to the famous conclusions that space contracts and time dilates. These conclusions cannot be obtained without application of the mathematical procedure termed evaluation. This procedure is routinely applied without appreciation of its importance. Here it is shown that the determination of the correct procedure for evaluation is critical to the conclusions obtained in relativity.

Evaluation defines the standard of comparison. What does this mean? When we transform space or time from frame $S$ to frame $S'$ we need a reference of comparison in order to say whether they are the same or if they are different. Obviously, taking a simplistic viewpoint, this standard is the standard of measure used in the frame where the measurement is to be performed. But this is where things start to go wrong. In special relativity, we begin by asserting that the standards of measure are the same in frames $S$ and $S'$ by hypothesis or assumption when we define the problem. Now when in special relativity we discover that space contracts and time expands, we must attribute this to a phenomenon occurring in the opposite reference frame. But what caused the change? A change in the opposite frame, a distortion due to observing from a different reference frame, or a change in the calibrations of the instruments used to make the measurements?

The mathematical procedure which allows us to assert that the transformed result in a reference frame is different from that of a standard of comparison is evaluation. Evaluation defines the reference frame of comparison. The usual procedure in special relativity is to transform from a rest frame into a relatively moving reference frame with the moving reference frame now interpreted as playing the role of rest frame. This does not automatically result from the application of a Lorentz transform. The procedure of evaluation is what establishes the moving frame as a new rest frame for purpose of comparison. Since this idea is unfamiliar, we will show in the following sections how this is accomplished by using the examples presented by Einstein in his foundational papers on special relativity.
To make these statements about the idea of the standard of comparison clear to the reader, some examples illustrating what this means will now be given. As noted above, Einstein assumes that the units of measure, the standard rods and clocks defined in the relatively moving reference frames are the same in both frames. This is a strong statement of identity. But, the result of the proof is that the observer in the opposite reference frame views the rods as contracted and the clocks as running slow. This is surely a paradox. Einstein assumes one thing and concludes the contradictory opposite is true.

So as a first step, we need to know where we are starting from. Clearly, unless we can make some judgement regarding the basis of comparison, the comparison is worthless, because we don’t know whether the clocks and rods were physically changed by the motion or whether their appearance changed. Furthermore, we need to be certain that the references which we use as the standards of measurement are indeed unaffected by the effects of motion which we are trying to determine.

When a condition of evaluation is defined, it defines the standard of measure as the standard established for that reference frame. For example, when evaluation is specified for \( x=0 \), or \( t=0 \), since these variables are defined in the \( S \) frame, then the standard of measure is defined in the \( S \) frame. Hence, for the solution equations given in section 4.1, evaluation with \( x=0 \) means that the results are expressed in terms of the standard of comparison defined in frame \( S \); i.e. a measure unit of length fixed in \( S \). Similarly, the equations given in section 4.3 with evaluation \( t=0 \), means that the results are expressed in terms of a clock calibrated in frame \( S \). Here the issue is critical, because we have no way of knowing whether a clock calibrated at rest in \( S \) maintains this calibration while at rest in frame \( S' \). This also means that the evaluations with \( x'=0 \) and \( t'=0 \) define the standard of measure being used as that defined in the moving frame \( S' \). Hence, clocks must be defined with a calibration applicable to that frame. As a caution to the reader, these calibrations of clocks refer to the rate of the clocks, and not to the reference zero of time or their synchronization.

### 5.1 Einstein’s Use Of Evaluation

Here the thesis is presented that Einstein’s careless use of evaluation and his lack of care in explaining the conditions of evaluation results in most of the paradoxes and inconsistencies in special relativity that have promoted confusion, argument, debate, and disagreement.

Let’s examine the derivation of length contraction and time dilation in Einstein’s 1905 paper. Einstein uses the Lorentz transform equations. The proof of length contraction proceeds by a backwards method. This is to define quantities in the moving frame first...
and then ask, what is viewed in the stationary frame. Einstein defines a sphere in the moving frame and then imposes an evaluation condition upon the Lorentz transform equations in order to solve for the equation in the stationary system. The evaluation condition imposed is that time in stationary frame is $t=0$. This is a specific evaluation condition. Evaluation occurs for time $t=0$ in the stationary frame. It establishes that the standard of length for comparison is defined in terms of distance defined in the stationary frame of reference.

Time dilation is approached completely differently. A clock is defined at rest in the moving system. The Lorentz transform for time is then used to go backwards from the moving frame into the stationary frame as before for space. But now instead of specifying that the time measure be performed at $x=0$ in the stationary system where a reference clock is located, Einstein applies a completely different evaluation condition. He specifies that $x=vt$, and substitutes this into the Lorentz transform equation. It's important to realize that if he had merely set $x=0$ the resulting method would have given a result consistent with length, a Lorentz contraction of time. He would have correctly concluded that time contracts as well as space. But, he did not do this, because he used an evaluation which specified that the moving frame is the standard for time comparison.

Now in 1907 the transformation of space is made more rigorous. But, the evaluation condition is unclear. Instead of specifying that $t=0$ in frame $S$, as he did in 1905, he says “the following relations hold...relative to the reference system $S$ at all times $t$ of $S$...” This is a puzzle. What does he mean here? I think it is a mistake, and is confusing because it implies that the measurement performed in $S$ is independent of time of the measurement. This may be true, but the point is that the evaluation occurs at a specific instant of time when measurements are all performed simultaneously in $S$. This mistake is corrected in 1910 where he says that “At any instant $t$ of the system $S$ we will have the following relations..’

This amounts to the following. Given the Lorentz transform $x'=\beta(x-vt)$, set $t=0$ and obtain the result that; $x'=\beta x$. Now inverting this result to obtain that the space coordinate in $S$ as a function of the coordinate in $S'$ we have the result that $x=\beta^{-1}x'$. This is the same result as given in equation 11 of section 4.3. But, there the correct solution is given by equation 9. Notice that in the above discussion we obtained the same result as in equation 9, but Einstein inverted this to obtain equation 11 in the form of a contraction of space.

A mystery is why Einstein does not apply the same procedure for time. He performs evaluation for time in frame $S'$ instead of $S$ which was used for evaluation of space. The equivalent evaluation condition is $x=0$. The Lorentz transform is $t'=\beta(t-vx/c^2)$. Setting $x=0$ gives, $t'=\beta t$, which is inverted or reversed as before to obtain the result that; $t=\beta^{-1}t'$. A
result which is in the same form as the result for space. The main question is why Einstein does not do this. In the 1907 paper he hides the procedure whereby he obtains the result that $t = \beta t'$. A result that he interprets to indicate that moving clocks run slow.

It seems clear that he has again used the evaluation condition $x = vt$. The procedure is as follows. Given $t' = \beta(t - vx/c^2)$, substitute $x = vt$ and obtain the result: $t' = \beta(t - x^2t/c^2) = \beta(t - v^2/c^2)t$. But Einstein does not stop here, he inverts this result as for space to obtain that $t = \beta t'$. The last step of inversion seems justified by the need to express the time as transformed from the moving frame into the stationary frame. This is the result that justifies that moving clocks run slow. But we notice that it depends on the unjustified assertion that $x = vt$. This is not the same condition as imposed on space where $t = 0$ was used. We saw above that using $x = 0$ gives a result consistent with the result for space contraction, so the result that moving clocks run slow is derived because Einstein asserted the condition $x = vt$. But there does not seem to be a physical justification for this evaluation condition. This condition says that the clock used to compare time in $S$ with time in $S'$ obtained from the moving clock is moving in frame $S$ with the velocity $v$ along the $x$ axis. This doesn’t seem to make sense so it must be wrong.

In Einstein’s 1910 paper, the divergence between the methods of evaluation for time and space finally becomes crystal clear. In this paper the method used in 1907 for space is almost exactly repeated with the clarification that the Lorentz transform is evaluated at the instant of time $t = 0$ in $S$. The main revisions occur in the derivation and evaluation of time dilation. Einstein shifts to a simpler method. He makes two significant changes. He uses the inverse Lorentz transform in place of the Lorentz transform, and he discards the condition $x = vt$ and replaces it with the condition that time is evaluated at $x' = 0$. (Notice however that these are really equivalent conditions.) Hence instead of setting the condition $x = 0$ in the Lorentz transform equation for time, he now uses the condition $x' = 0$ in conjunction with the inverse Lorentz transform for time, i.e. the equation: $t = \beta(t' + vx/c^2)$. This reduces to $t = \beta t'$, the result which proves that moving clocks run slow when the evaluation condition $x = 0$ is specified. But this merely says that the clock in $S'$ is located at $x' = 0$, a condition that seems unnecessary. What is not specified is the location of the comparison clock in $S$, the clock that is used to determine the difference, if any, between the time marked by the clock in $S'$ and the reference clock in $S$ at rest at $x = 0$.

We see that evaluation determines the result which we obtain for the transformation of either time or space. Whether the moving clock runs slow or runs fast is not determined by its motion, but by the evaluation conditions applied to the Lorentz transform equations. Hence, we see that there is no compelling reason to accept the result that moving clocks run slow is the correct prediction, because the theory also predicts that moving clocks can run fast simply by changing the evaluation condition used. Hence unless a physical reason can be established to determine why the conditions of
evaluation, specified by Einstein are the correct ones, then we can not say which prediction of the theory is the correct one which is to be compared with experiment.

6.0 The First Contradiction Theorems

According to the traditional interpretation of Einstein’s relativity, the 16 equations given in section 4.0 should represent all the solutions needed for the transformation of intervals of time and space. This interpretation assumes that all the solutions are true statements in the theory of relativity, because according to Einstein’s relativity postulate, all reference frames are equivalent as rest frames. Hence the results obtained for evaluation in frame S in sections 4.1 and 4.3 are true, and the results obtained for evaluation in frame S’ in sections 4.2 and 4.4 are also true. This follows from the principle of relativity and symmetry. The following theorem proves this is false.

6.1 First Contradiction Theorem

Theorem: If the same standard of measure is valid in frames S and S’, then either the solutions with evaluation in S are true, or the solutions with evaluation in S’ are true, but solutions resulting from both evaluations; i.e. S and S’ together, taken as simultaneously true, are contradictory.

Proof: Suppose both solution sets in section 4.0 are true and represent valid solutions. Then, for every true statement of the form A=L(B) obtained using an evaluation in S (S’), there exists a corresponding true statement of the form B=L(A) obtained using an evaluation in S’ (S). Here the function L denotes a Lorentz transform, or an inverse transform, evaluated in S (S’). Both of these statements cannot be true simultaneously, so there is a contradiction.

In these statements, the objects A and B have the same meaning and are the same symbols in both statements. The functional relation can be expressed either as greater than or less than depending on the actual function. For A=\beta B, since \beta>1, we have A>B. For A=\beta^{-1}B, since \beta^{-1}<1, we have A<B. The procedure for forming statements with the opposite evaluation is Einstein’s procedure for forming the inverse Lorentz transform. Given any valid statement, the true statement for the opposite evaluation is formed by exchanging symbols; i.e. replace A with B and B with A. The statements formed in this way are contradictory to the original statements. Hence the two statements taken together form a contradictory pair. Therefore, if we claim that only statements resulting from evaluation in S (S’) are true, there is no contradiction because we no longer claim statements using the opposite evaluation S’ (S) are true. QED

To make this clear consider the following example using equation 2 obtained by evaluation in S. We have for the condition x=0: t’=\beta t. Hence t’\geq t. By the procedure of
exchanging symbols we have the result given in equation 8 obtained by evaluation in S'.
We have for the condition x' = 0: t = βt'. Hence, t > t' or t < t. These results both taken as
true are contradictory since they imply that t' is both greater than and less than t
simultaneously. So both statements can not be true, otherwise we have a contradiction.

Alternate Proof by Enumeration of Solutions: We enumerate the contradictory
equations for transformation of time as equations 2 and 8. Section 4.5 indicates these
are the primary solutions for time, the secondary solutions are equations 4 and 6. We
show that equations 2 and 8 are contradictory as follows. Solving equation 2 we have
β = t'/t and solving equation 8 we have β = t/t'. Hence t'/t = t/t' or (t')² = t². Therefore t = t',
which contradicts both equations 2 and 8. By similar procedures contradictions are
obtained for equations 4 and 6 the secondary solutions for time. For the primary
solutions for transformation of space equations 9 and 15 there is a contradiction and for
the secondary solutions equations 11 and 13 there is a contradiction. The reader can
easily prove the contradiction using the method given above for equations 2 and 8.

6.2 First Corollary To First Contradiction Theorem

Corollary: Conclusions obtained by combining two different statements obtained for
space and time using different evaluation conditions are false.

Proof: Suppose we have a true statement regarding transformation of space (time)
obtained by evaluation in S (S'), and we have a true statement regarding transformation
of time (space) obtained by evaluation in S' (S). Then by the first contradictory theorem,
both cannot be true statements. Hence any conclusions obtained or statements made
which rely upon the simultaneous truth of both statements are false. QED

6.3 Second Corollary To First Contradiction Theorem

Corollary: Einstein’s special theory of relativity is false.

Proof: Einstein’s theory asserts, as a true statement, that there exists a Lorentz
contraction for objects at rest in a moving reference frame in accordance with equation
11, obtained using evaluation in frame S. Einstein’s theory also asserts, as a true
statement, that there exists a time dilation for clocks at rest in a moving reference frame
in accordance with equation 8, obtained using evaluation in frame S’. Einstein’s theory
claims these two statements are true statements within the theory and relies upon these
two conclusions and uses them to obtain further conclusions. Since these two
statements were obtained using evaluation in frames S and S’, by the first corollary
given above, any theory based on the simultaneous truth of both of these statements is
false. QED
6.4 Implication of Second Corollary

The result that two different evaluation conditions cannot be used simultaneously requires a revision of conclusions regarding the action of Lorentz transforms on space and time. Since we can not use different evaluations, then only the solutions of sections 4.1 and 4.3 or sections 4.2 and 4.4 can be used together. Therefore, the simultaneous truth of equations 8 and 11 as claimed by relativity is impossible. The discussion in section 4.5 shows that equations 2 and 9 or equations 8 and 15 must be the only two possible pairs of solutions in relativity. Notice that in both cases these are both dilations of time and space. The proof that the transformation of space must be a dilation is shown by the solution of equations 10 and 15 with the result $x' = \beta x$ (Equation 9), or equations 14 and 16 with the result $x = \beta x'$ (Equation 15).

7.0 The Second Contradiction Theorems

In Einstein's theory of relativity, the primary solutions for time given by equations 2 and 8 are considered inverse or reciprocal solutions and the secondary solutions for space given by equations 11 and 13 are considered inverse or reciprocal solutions. These have been traditionally regarded as the solutions for the transformation of time and space in relativity. So we see that the traditional solutions of relativity are incomplete, because they fail to take all of the solutions into consideration.

This subset of evaluation equations can be obtained by the following procedure. Given any equation obtained by an evaluation, the solution for the opposite evaluation is obtained by exchanging the symbols in the original equation. For example, given equation 11, equation 13 is obtained by exchanging symbols; i.e., $x'$ for $x$ and vice versa. The conclusions drawn from these equations are contradictory. Hence, they can not be inverses. To see that this is true, take any equation obtained by evaluation in $S$ and the corresponding equation obtained by evaluation in $S'$. Examples are 9 and 15. The proof of contradiction is the same as the above proof, since this definition of the problem gives the same pairs of solutions which were shown above to be contrary solutions. The following theorem and corollaries puts this result in the form of a formal proof.

7.1 The Second Contradiction Theorem

Theorem: The claim in relativity that equations 2 and 8 for time and equations 11 and 13 for space are inverse or reciprocal transformations from $S$ into $S'$ and vice versa is false.

Proof: By definition of the inverse of a linear equation, given the equation $A = \beta B$, the inverse of this equation is solved as $B = \beta^{-1} A$. Therefore, for $v > 0$, $\beta > 1$, we have that $A > B$ and $B < A$. These results are inverses and are not contradictory. The conclusion is that
the inverse solution reverses the relation of A to B and vice versa. However, we notice by examining the solutions given in equations 1 through 16 that we have contradictions when we solve the Lorentz and inverse Lorentz transform pairs. The standard results are: Equations 2 and 8 for time, and equations 11 and 13 for space. Simultaneous solution of these equations result in a contradiction as proved in the first contradiction theorem. Therefore, these solutions can not be inverse as claimed in the standard expositions on relativity theory and assumed by Einstein in his fundamental papers. QED

7.2 First Corollary

In the solutions given as equations 1 through 16, we notice that for a given condition of evaluation, the primary solutions and the secondary solutions are inversely related.

Corollary: When the same evaluation condition is imposed or used, the evaluation solutions for the Lorentz transform and inverse Lorentz transform are inverses.

Proof: An equation of the form $A = \beta B$ has inverse in the form $B = \beta^{-1} A$ and vice versa. Since the primary and secondary solutions take the form given above, they are inverses. QED

Proof By Enumeration of Solutions: Consider the solutions given in section 4.1 for the evaluation condition $x=0$. The evaluation solution for the Lorentz transform of time is given in equation 2 as $t' = \beta t$ and the solution for the inverse Lorentz transform in equation 4 as $t = \beta^{-1} t'$. By the second contradiction theorem we see that these solutions are inverses. Applying the same procedure to sections 4.2, 4.3, and 4.4 we see that the theorem is proved.

7.3 Second Corollary

Corollary: Einstein’s theory of relativity is false because it asserts that equations 2 and 8 and 11 and 13 are inversely related.

Proof: The theory asserts as true the above statements which are proved false in the second contradictory theorem given above. Therefore the theory is false. QED

8.0 The Third Contradiction Theorem

In the first contradiction theorem and its corollaries, it was proved that true statements obtained from either evaluation in S or evaluation in S’ are true but not both at the same time. From this it was shown that the theory of relativity is false because it bases its
conclusions on evaluations from both sets at the same time. But it is clear that this problem can be corrected by obtaining true statements using only evaluation in either S or S’. However, knowledge of the correct evaluation condition is unknown. In this section the objective is to ascertain the correct evaluation condition for time. The solution is not as easy as it seems, because the problem of determining the correct evaluation for time is complicated by a blunder made by Einstein in his 1905 paper with respect to the rate of the clock in frame S’.

8.1 Theory Of Clock Comparison In Special Relativity

A clock is generally defined today as a system which produces an output without an input. What this means is that a clock measures time by counting the vibrations or beats of a self sustaining oscillatory system. The type of self sustained oscillation used in 1900 was a mechanically vibrating system which performed repetitive harmonic motions. The specific requirement of the vibrations, which was required to make a good clock, was the exact repetitive nature of the harmonic motion so that the cyclic motion always repeated itself within the same interval of time. This time interval is called the period of oscillation, and the reciprocal of the period of oscillation is called the frequency of oscillation.

Time measurement circa 1900 was performed by counting the oscillations or beats of the clock using a dial mechanism which converts the vibration counts into dial readings, calibrated in terms of measures of time intervals; usually days, hours, minutes and seconds. The beats measure tiny intervals of time, these are counted and related to the dial movement or ticks, so that a certain number of beats corresponds to a standard interval of time. Since the counting of beats is fixed in relation to the dial reading, the main error that effects the time measure is the change in period of the harmonic vibrations.

The method used to display time related the clock beats to time intervals inversely via the dial readings. Clocks are calibrated in terms of time by comparison to a standard of time. This standard is a clock maintained by the government at an astronomical observatory. A clock is said to run slow when it reads time behind the reference standard of time. It runs fast when it reads time ahead of the reference. This process requires that the readings of two clocks be obtained and compared when the standard clock has run for a defined interval of time by its own measure. The terms fast and slow therefore refer to the rate of beats of the clock compared with the reference. Rate is a measure of the frequency of vibration. When the clock runs fast, its vibration frequency is higher than the reference clock frequency, and when it runs slow its frequency is lower than the reference clock frequency. The reverse is true for the time interval or period of the vibrations. The clock runs fast when the time period is smaller or less than the reference time period, and it runs slow when the time period is longer or
greater than the reference time period.

The reader should notice the following important result. With the definitions used here, the dial readings of clocks are inversely related to the changes in time interval. (The dial of a slow clock reads less than the reference because its period of oscillation is longer than the reference.) A slow clock reads behind the reference because its period is longer. The clock is slow because there are fewer beats or ticks of the clock during the reference time period. The frequency is lower, and the time required to complete one period of oscillation is longer than the reference. A clock reads fast because more ticks are recorded during the reference time period. The frequency is higher, and the time to complete one period of oscillation is less than the reference period. Hence while the dial readings of clocks are directly related to the clock rate, they are inversely related to the transformation of the time intervals.

When discussing the transformation of clock rate between reference frames, it is not necessary to consider dial readings. We can compare the clocks based upon the transformation of time intervals directly. Because the period is inversely related to clock rate, the direct transformation of time intervals gives the necessary result. A clock runs fast when the transformation contracts the time interval; numerically a smaller measure, and it runs slow when the time interval is dilated; a numerically larger measure. In the following sections, we will see that Einstein makes a serious blunder when he confuses the time as defined by clock dial readings with the transformation of real time intervals.

The procedure for clock comparison is as follows. A reference clock is defined, and it runs for a unit of time by its own measure. The comparison clock is defined and it is started or adjusted so that its start time coincides with the start of the reference clock. The dial readings which represent time intervals are compared at the end of a unit of time run on the reference. But, we can not use this procedure unless we assume that the time that is measured is the same for both clocks. When we are trying to determine if there is an actual change in clock rate due to possible differences in time scale, the comparison of time intervals is preferred. Since the supposed relativistic transformations change the time scale, the preferred method is to directly compare the frequencies of oscillation as the measure of clock rate.

8.2 The Theory of Mathematical Transformation

The deceptively simple procedure for clock comparison is complicated by the problem of transformation of time in the theory of relativity. The question arises: What is to be compared when we do the measurement? Mathematically we need to define the symbols that represent the intervals used in the comparison of clock rate measurements. There are two symbols used in the transformations; one for the domain
of the transformation, and one for the codomain. But they don’t always represent the same concept in terms of clock time. In some cases, the symbols represent the time determined by the reference clock in the rest frame, in others the time generated by the moving clock and measured in the rest frame, and in others the time obtained from the clock situated at rest in the moving frame. The different cases depend on how the Lorentz transform is interpreted. Three specific cases can be identified: projection as a contraction, projection as a dilation, and a change of basis or time scale change. The interpretation of the symbols used is different in each of these cases.

The solution to the problem of transformation of time intervals is based on the use of the Lorentz transform. This is a relation that expresses coordinates defined in what Einstein calls the stationary frame into coordinates of the moving frame. Mathematically it is a relation that transforms the rest frame space-time events taken as the domain into the moving frame space-time events taken as codomain. In order to express the transformation in terms of time coordinates only, a procedure termed “evaluation” is used to eliminate the spatial coordinates from the solution. Einstein does this by substitution of the equation $x=vt$, into the Lorentz transform. Einstein’s evaluation is mathematically equivalent to evaluation by solving the Lorentz transform for space-time events located at the coordinate $x'=0$ in the codomain or the moving frame. The resulting equation is then reduced to its simplest form. Einstein obtained the result: $\tau=tp(1-v^2/c^2)$. We see that this equation expresses the moving frame coordinates in terms of the rest frame coordinates. But, the solution requested the reverse of this; rest frame time in terms of moving frame time.

An unrecognized complication is that there is an alternative method of evaluation of the Lorentz transform. This procedure is to evaluate the Lorentz transform for the space-time events located at $x=0$ in the domain. The first procedure results in a contraction of time in the codomain and the second in a dilation in the codomain. Unfortunately these solutions are not what is required if we are asked to determine what is the rate of the clock in the moving frame when it is viewed from the rest frame. This problem is solved by inverting the results of the previous evaluations. Then the contraction becomes a dilation and the dilation a contraction. The third alternative is that the Lorentz transform is a scale change or basis transformation between reference frames. The result is either a contraction or dilation as determined by the evaluation, but the procedure for comparison of the time intervals is different in this case. The result of the first two cases is a comparison of the apparent transformation of time, while in the last case, the results represent a real change in the rate of the moving frame clock. With this brief introduction to the issues that must be confronted, we proceed to the examination of Einstein’s method of solution.

8.3 The Third Contradiction Theorem
The third contradiction theorem results from the fact that we can not use the same equations for time intervals as for clock dial readings.

Third Contradiction Theorem: If the same standards of measure are valid in both reference frames, then all of the solutions given in equations 1 through 16 defined in terms of clock dial readings are true. (But not all are simultaneously true as discussed in section 6.2.) If we define time in terms of time intervals, all of the solutions given are also true. (But not all are simultaneously true as discussed in section 6.2.) But if we exchange the symbol meanings in these equations so that time intervals replace dial readings, or vice versa, then the two true statements obtained from the same equation are contradictory when we interpret them both as time.

Proof: Since time as dial reading is inverse to time as period of oscillation, or clock beat, we have the relation \( t_d = K/t_p \), where \( t_d \) refers to the dial reading of the clock, \( t_p \) refers to the period of oscillation, and \( K \) is a calibration constant that relates the oscillation counts to the clock dial reading as defined by the standard time unit. The assumption is that the clocks in frames \( S \) and \( S' \) are calibrated the same so that \( K=K' \).

Given a Lorentz transformation of the form \( A_d = L(B_d) \) where \( A_d \) and \( B_d \) denote clock dial readings in \( S \) (\( S' \)) and \( S' \) (\( S \)) respectively we substitute the equivalent time in terms of oscillation periods. Hence, we now have, \( K/A_p = L(K/B_p) \). Since the Lorentz transform \( L \) is a linear function, the equation is solved obtaining the following result: \( B_p = L^{-1}(A_p) \), where the function \( L^{-1} \) means that the resulting function is inverse to the function \( L \). So that if the original functional relation after evaluation in terms of dial readings was \( A_d = \beta B_d \) (or \( A_d = \beta^{-1} B_d \)) the result in terms of oscillation period is \( A_p = \beta^{-1} B_p \) (or \( A_p = \beta B_p \)). The conclusion follows from the fact that the resulting equation in terms of oscillation period contradicts the equation in terms of dial readings if we assume that the symbols for dial readings and time period both have the same meaning as time.

To demonstrate the contradiction we assume that the symbols for dial reading and time interval have the same meaning so we make \( A_d = A_p = A \) and \( B_d = B_p = B \). Then solve the first equation as \( \beta = A/B \) and the second equation as \( \beta = B/A \). Hence \( A/B = B/A \) or \( A = B \). Which contradicts the conclusion that the times \( A \) and \( B \) are different. QED

8.4 First Corollary

First Corollary: If the contradiction is true for an evaluation solution, then it is also true for the inverse of this solution.

Proof: Since the inverse of any solution is obtained by inversion, the above proof is repeated with all the equations inverted. The result is also a contradiction. Because inverting all the equations doesn’t change the contradiction which results. QED
8.5 Second Corollary

Second Corollary: If a solution of an equation is obtained based on dial readings as time, and a second solution is obtained using its inverse based on time interval or period as time, then the two solutions are contradictory.

Proof: By the second contradiction theorem and the previous corollary, we cannot use the same equation, or its inverse, with two different definitions of time, to deduce the same result. QED

8.6 Third Corollary

Third Corollary: The theory of relativity as presented by Einstein and taught by textbooks is false.

Proof: The theory of relativity presented by Einstein in his fundamental papers makes the assumption that clock dial readings are the same as time intervals or periods. So that the relations $A_d = A_p$ and $B_d = B_p$ are assumed true for all the results in the theory. By the result of the previous theorem, this assumption is contradicted, hence it is false. Therefore, all conclusions based on this assumption; ie the theory of relativity, are false. QED

A particular example where the same equation is used to show clocks run slow based on dial readings and based on time intervals will now be discussed. The result of the second contradiction theorem explains many of the curious and confusing results given in the textbook explanations of relativity. It also explains the biggest blunder which Einstein made in his fundamental papers on relativity. This blunder has escaped detection for 100 years.

In his 1905 paper, Einstein obtained the result given in equation 6: $t' = \beta^{-1} t$, based on the use of clock dial readings. In 1907 he obtained the result given in equation 8: $t = \beta t'$, based on comparison of clock oscillation period. The first is the secondary solution for the evaluation condition $x' = 0$, and the second is the primary solution for the evaluation of the Lorentz transforms in frame $S'$; ie, $x' = 0$. Since the two equations are inverses, they represent the same primary solution; ie, equation 8: $t = \beta t'$, by the result of the second contradiction theorem and its corollaries above, the same Lorentz transform evaluation can not give a consistent result for both clock dial readings and period of oscillation. But, in his 1905 and 1907 papers, Einstein claims the same result, that moving clocks run slow. This is false.

It is much easier to prove this result by direct calculation than by the method given
above. The reader can prove this for himself by converting the time symbols in equations 6 and 8 to frequency and solving the equations. This result was quite a puzzle for the author until it was realized that the conclusion given in Einstein’s 1907 paper was false. The explanation for the discrepancy remained a conundrum until the explanation that dial time and time intervals are inversely related was discovered.

Analysis shows that the calculation in the 1907 paper is wrong. The correct result is that the frequency of oscillation is increased by motion and not decreased as Einstein claimed in his paper. The correct solution for this problem is given by equation 2: t’=βt, the primary solution for evaluation in S. Solving for the frequency relation between clocks in S and S’ using this equation gives the result that the frequency of the oscillator in the S’ clock is less than that of the S clock, so the S’ clock is running slow. By the same procedure, the solution using equation 8, which Einstein used in his 1907 and 1910 papers, gives the result that the clock in S’ runs fast.

The above result refutes the primary experimental result which is claimed to prove relativity, the Ives-Stillwell experiment. In this experiment, fast moving canal rays were shown to exhibit a redshift of their spectral lines. According to Einstein’s 1907 paper, this result was consistent with his theory as expressed in equation 8. But as we saw above, this equation indicates that moving clocks should have blueshifted spectral lines and not redshifted ones. Hence the theory is disproved by the experiment and not validated by it as claimed in textbooks.

9.0 The Fourth Contradiction Theorem

The interpretation of the theory of relativity is often given that physical distances actually contract and that clocks actually run slow in the moving reference frame S’ relative to S and vice versa. The first explains the Michelson experiments and is essentially the FitzGerald-Lorentz hypothesis that physical forces cause a contraction of the experimental apparatus in the direction of motion. The second is the most famous prediction of relativity and is apparently confirmed by the Ives-Stillwell and mu-meson experiments. This interpretation is proved false by the following theorem.

9.1 Fourth Contradictory Theorem

The interpretation to be examined takes as its assumptions that the standards of measure are the same in S and S’ and that clocks and measuring scales used are identical. The results are summarized in equations 2, 8, 11 and 13.

Theorem: Given a strong identity of reference frames in which it is assumed that the standards of measure and the coordinates of distance and time measure are the same for the frames S and S’, we have that distances measured in S are the same as
distances measured in $S'$ (identity of proper distances). Also that clocks have identical calibrations in $S$ and $S'$ so that measured times in $S$ and $S'$ are the same (identity of proper times). Here we assume that either the clock dial or frequency method of time measure are used consistently throughout. Then the results for the transformation of distances and times given by equations 1 through 16 from $S'$ into $S$ and from $S$ into $S'$ simultaneously are contradictory.

Proof: The proof follows from the first contradictory theorem and its corollaries because the conclusion relies upon the use of evaluation in both $S$ and $S'$ simultaneously. QED

9.2 First Corollary

A second interpretation is sometimes given which asserts that the proper times are the same in frames $S$ and $S'$ and the times in the opposite reference frame are transformed. Here a proof that this is impossible is demonstrated.

First Corollary: Given a strong identity of reference frames as described above, if we assume that the proper distances and times in $S$ and $S'$ are the same, the result is a contradiction. Here the assumption of simultaneity of solutions is relaxed.

Proof: We assumed that the proper distances and times were the same in $S$ and $S'$. The result that moving clocks run slow and that distances are contracted contradicts this assumption. QED

The result of this can be stated this way. Even if we don't require that transformations be simultaneously reciprocal, the assumption that proper times are the same is contradictory, because the conclusion contradicts the hypothesis. This situation is why Einstein's theory is described as a paradox. We started by assuming that measuring rods and clocks were the same in frames $S$ and $S'$, and ended by concluding that time and space in frames $S$ and $S'$ are different. This is certainly a contradiction, but relativity turns it into a paradox by asserting that this strange result has something to do with the relativity of simultaneity. But the arguments used to prove this are confusing and obscure, and the result is not very convincing to a skeptic. On its face, the most fundamental claims of the theory are based on a contradiction.

9.3 Second Corollary

The classic way that relativity theorists refute this conclusion is to assert that the transformation equations do not transform the physical quantities of time and space, but instead transform the appearance of these from the point of view of a relatively moving observer.
Theorem: The 1907 interpretation of relativity that the measurements are merely paradoxes and not contradictory is irrelevant.

Proof: Either the predictions of relativity are all true and have physical meaning with regard to experimental prediction, or they don't. The first conclusion is negated by the above proofs, hence the conclusion follows. QED

This can be succinctly stated as follows. Physical theory deals with the real facts of physical relations in the real world. Hence, we are required to deal with calculations which address facts that can be calculated in terms of physical laws. If we assert the claim that the physical measurements indicate that physical changes only appear to have occurred or are illusions of perspective then these facts have no bearing on the actual calculations of physics because we know that the quantities required are the proper times and distances which are invariant. The measured results then are illusions of perspective and they have no physical meaning for the observer other than observational errors that must be corrected before they can be used in calculation. Hence, they have no meaning as physics outside of the need to correct the observational error.

10.0 The Fifth Contradiction Theorem

The claim of the 1905 and 1907 theories is that an observer in S sees objects at rest in S' with measured length x' in S', as having length $\beta^{-1}x'$ when measured in S. So the conclusion follows that the measured length in S is contracted relative to the same standard of measure used in both reference frames. Hence it appears that the standard of measure is different when objects are measured across reference frames, because objects have a smaller measure and thus appear to be contracted in length by the motion. In the 1907 theory, but not the 1905 theory, a similar claim is made for time. Here identical clocks viewed across relatively moving reference frames appear to have different standards of measure so that moving clocks appear to run slow.

This difference in emphasis has been the source of considerable confusion in the theory of relativity. Many textbook writers adhered to the interpretation of section 9.0 while others adopted the new interpretation of 1907. In many cases the differences were presented in a subtle way. For example, in his famous popular exposition on relativity titled “Relativity, The Special and General Theory”, Einstein is deliberately vague regarding the interpretation of the changes in space and time. Thus reinforcing the confusion of the meaning of the theory.

The difference however is clear in the 1907 paper where Einstein makes a distinction in section 2.0 between kinematics and dynamics, and reinforces this distinction by defining the additional concepts of geometric shape and kinematic shape. As Einstein
puts it, for rest observers the kinematic and geometric shapes are the same. Then he says “It is clear that observers who are at rest relative to a reference system $S$ can ascertain only the kinematic shape with respect to $S$ of a body that is in motion relative to $S$, but not its geometric shape.” This is followed by a statement which negates the apparent clarity gained by the introduction of this new distinction. Einstein says “In the following, we will usually not distinguish explicitly between geometric and kinematic shape; a statement of geometric nature refers to kinematic or geometric shape, respectively, depending on whether the latter refers to reference system $S$ or not.” No wonder textbook writers continued to use the older interpretation that the observed changes reflected changes in real quantities of measure.

The 1907 paper also introduces the ultimate confusion factor. Einstein tells us in section 2.2 “According to the definition of time given in 1.0, a statement on time has a meaning only with reference to a reference system in a specific state of motion. It may therefore be surmised (and will be shown in what follows) that two spatially distant point events that are simultaneous with respect to a reference system $S$ are in general not simultaneous with respect to a reference system $S'$ whose state of motion is different.” This has been the source of even more confusion, argument, and acrimonious debate than the confusion and argument regarding the meaning of the transformation of time and distance intervals. On the surface, it contradicts the underlying assumption that a relation between times and distances in $S$ and $S'$ can be obtained mathematically. Because the relation requires a simultaneity of events between frames $S$ and $S'$ in order to make a comparison. Furthermore, it appears to deny any real meaning to relativity as a physical theory which deals with real quantities of measurement.

The problem is as follows. If we accept this argument as given, it means that Lorentz transforms have no meaning, because their specific function is to relate simultaneous events measured in terms of the coordinates defined in $S$ and $S'$ so that meaningful physical conclusions can be obtained from the measurements. The statement claims this is impossible so the entire theory is useless. Clearly arguments which invoke the relativity of simultaneity are invalid for this reason. The author’s position is to base all arguments on the mathematical evaluation of the Lorentz transformations.

**10.1 The Fifth Contradiction Theorem**

In this theorem it is shown that the complete set of solutions contradicts the interpretations based on the traditional subset of solutions. When the complete set is used the theory is refuted.

First Lemma: The fundamental claim of the 1907 version of relativity that the proper times are identical in frames $S$ and $S'$ is false.
Proof: The primary assumption of the 1907 version of relativity is that the standards of measure and the proper distances and times for observers at rest in S and S’ are identical. So we have the same strong identity of reference frames as defined above. An additional assumption is that the reference frame S’ has velocity v relative to frame S and reciprocally that the reference frame S has velocity -v relative to frame S’. The proof follows by deducing a contradiction between the above statement of the claims of the 1907 theory and the solutions to the Lorentz transform equations given by equations 1 and 3 or 5 and 7 for time in sections 4.1 and 4.2.

According to the claims of the 1907 theory, an observer at rest at x=0 in S passes an observer at rest coordinate x’ in S’ at time t=x’/v, since we have x’=-vt. Similarly, an observer at rest at x’=0 in S’ passes coordinate x in S at time t’=x’/v, since we have x=vt’. These statements follow from the assumed relative velocity of reference frames and the identity of coordinates systems and proper times and distances. By symmetry an observer at rest at x’ =vt in S’ sees the origin of S pass at time t’=x/v and an observer at rest at x=-vt’ in S sees the origin of S’ pass at t=x’/v. From these results we deduce that t=t’ and x=x’ for these observers as required by the identity of proper times and distances. But, according to the solutions of equations 1 and 3, an observer at rest in S’ at x’ sees the coordinate x=0 pass at time t’=βt. Similarly, an observer at rest in S at x sees the coordinate x’=0 pass at time t=βt’, hence the claims of the 1907 theory that x’=vt=vt’=x for observers relatively at rest is contradicted. QED

In the first lemma, it was shown that the assumption that proper times are the same in S and S’ is contradicted by the additional solution equations. Hence these solutions are crucial to obtaining the correct theory of relativity. The problem is now addressed for space by a slightly different method.

Second Lemma: The fundamental claim of the 1907 version of relativity that the proper distances are identical in frames S and S’ is false.

Proof: We have the same assumptions as in the first lemma. We take the case where the evaluation solutions for t=0 and t’=0 are given in sections 4.3 and 4.4. By the definition of the coincidence for reference frames, we have that at time t=0 for observers in S and time t’=0 for observers in S’, that the reference frames exactly coincide, so that all the space coordinates are identical; ie, at t=t’=0, all x=x’, y=y’, and z=z’. The solution of equations 10 and 12 is x’=βx and the solution of equations 14 and 16 is t=βt’. Hence the solutions of the Lorentz transforms contradicts the assumption, so the basis of the theory is false. QED

This lemma clearly shows that the solutions to equations 10, 12, 14 and 16 is crucial to obtaining the correct theory of relativity.
Fifth Contradiction Theorem: The 1907 theory of relativity which assumes that the proper times and distances in rest frames S and S’ are identical is false.

Proof: The proof follows from the results of the first and second Lemmas. The first Lemma shows that the assumption of identity of proper times in S and S’ is false because the theory claims t=t’ and the Lorentz transform solutions contradict this. The second Lemma shows that the assumption that proper distances are the same in S and S’ is false because the Lorentz transform solutions contradict this. Hence the theory is false. QED

If the reader is skeptical about this proof, he should consider the following. If the assumptions of relativity were correct and the theory valid, then the solution for equation 1 should have been x’=-vt and not x’=-βvt as was obtained. The solutions for equation 10 should have been t’=-vx/c^2 and not t’=-vβx/c^2 as was obtained.

11.0 The Sixth Contradiction Theorem

Here we return to the 1905 version of relativity, which could be made consistent with the evaluation solutions, as long as we don’t attempt to evaluate in frames S and S’ simultaneously (see section 6.1). This version makes the claim that the proper times and distances are the same, and concludes that they are different in frames S and S’. However, the meaning of the Lorentz transformations evaluated in a reference frame for the transformation of distance is not the same as the meaning assigned to the transformation of time. This is one of the main reasons of the persistent confusions of relativity. Here the objective is to make clear that we can not mix the two different interpretations for time and space as Einstein does in his 1905 paper. To make this difference clear, remember that Einstein claims that distances appear contracted when viewed from the oppositely moving frame, and that the moving clock viewed in the oppositely moving reference frame runs slow because motion changes its time scale. A moving clock at the equator runs slow relative to one at rest at the poles according to Einstein.

Sixth Contradiction Theorem: When the restriction that the standards of measure must be the same in S and S’ is removed, the conclusions regarding the meanings of evaluation equations for time and space in section 4.0 are contradictory.

Proof: Suppose we assign two different meanings to the symbols used to represent time t and space x. We assign subscripts for these two different meanings as follows. Let the subscript S indicate the meaning as used in Einstein’s 1907 paper that the symbol represents a variable as viewed or appears to an observer in reference frame S. The subscript S’ means the symbol represents a variable viewed or appears to an observer in reference frame S’. Now the equation A’_{S}=L(B_{S}) has the following meaning.
It refers to the Lorentz transform of the quantity $B$ observed in $S$ as observed by an observer in $S'$. We can remove the observer and make this objective by asserting that this means the following. The equation $A'_S = L(B_S)$ means the same as $A = L(B)$ when the standards are the same for $S$ and $S'$. When the standards in $S$ and $S'$ are different the meaning of the equation is reversed so that we have $A = L^{-1}(B)$. The equation $A$

But when the standards are not the same in $S$ and $S'$, there are two contradictory meanings for the equation.

Suppose we assign the following meaning for the results of the equations of the evaluation of distance by fixing an evaluation in time. The results are in sections 4.3 and 4.4 for evaluation in $S$ and $S'$ respectively. Equation 11 is interpreted to mean that an observer at rest in $S$ sees an object at rest in $S'$ contracted according to the relation $x = \beta x'$. Where $x$ is the rest distance defined in $S'$. Since the standards of measure are assumed the same in $S$ and $S'$, the object measured at rest in $S'$ is the same size as the same object measured at rest in $S$. A contradiction called the Ehrenfest paradox arises because of the apparent contraction of the object when viewed in motion. The paradox is this, either the object actually contracted when placed in motion or the appearance contracted due to its being viewed from the opposite rest frame. In either case,

The problem here boils down to the following dilemma. Given the same standards of measure in frames $S$ and $S'$, the proof that a moving clock runs slow at rest in $S'$ depends upon a comparison with a clock at rest in $S$. The assumption that the two rest frames are equivalent is reflected in the fact that the standards of measure are the same in $S$ and $S'$. Since the standard of length is defined by a rigid rod, then the rod is the same length in both frames by the assumption that the standard of measure is the same in both frames. Hence this assumption rules out the FitzGerald-Lorentz contraction hypothesis. Rigid rods are unchanged by their state of motion. Unfortunately, the same conclusion is contradicted by Einstein's statements regarding clocks. In the 1905 paper he clearly states that the clocks in the moving frame run slow. The result must contradict the assumption that the standard of measure is the same in both reference frames. Further, it is inconsistent with the length contraction result. So Einstein's 1905 theory is contradictory and false.

It is instructive to see why he did this. The answer lies in the fact that the 1905 theory is clearly incomplete and fallacious. If we examine the Michelson experiments, then the solution arises from the FitzGerald-Lorentz contraction hypothesis the there is a physical contraction of length in the direction of motion. In 1904, Lorentz gives a physical rational for how this contraction occurs.

Einstein's 1907 theory proclaims that “…a sufficiently sharpened conception of time was
all that was needed to overcome the difficulty ...”. Although, this statement does not appear in the 1905 paper, its inclusion there would have made clear some of its inherent ambiguities. The conclusion that many readers drew from the theory was that in Einstein’s new theory, the negative result of the Michelson experiments was not due to a FitzGerald-Lorentz contraction of space, but due to a similar distortion of time. Hence we see people referring to the FitzGerald or Lorentz contraction of time. Others saw the same effect but called it dilation of time. Ultimately Kennedy and Thorndike performed their now classic experiment and proclaimed that it, proved the “relativity of time”. A statement which only makes sense if the result is designed to prove the hypothesis that time dilates (or contracts depending on the interpretation) to yield the null result of the Michelson and Kennedy-Thorndike experiments.

Unfortunately, this interpretation creates the paradox that space must contract if time is dilated. The interpretation that space contracted only when viewed from the opposite reference frame contradicted the idea that time actually dilated in the frame of motion. Hence the need to be consistent and remove the contradiction.

In 1907, Einstein endeavored to remove the contradiction by making the assumptions regarding the standards of measure in S and S’ consistent. There the assumption is that the rate of the clock in S’ is the same as the rate of the clock in S, but that the frequency of the clock S’ appears redshifted or is slow when viewed from S. In this version of the theory, the standards of measure for both space and time are the same in frames S and S’. This also means that rods remain the same length and clocks ran at the same rate when measured in terms of the same standard of measure at rest in the reference frame. The relativistic effects were then interpreted as a result of the act of measuring from the opposite frame. So in this interpretation, the standards of measure were different only when the measurement was performed across reference frames. Unfortunately this apparently beautiful way of escaping the contradiction created other contradictions which have remained unnoticed until now.

The experimental results of the Haefle-Keating experiment, which is hailed as proof that relativity is correct, show the following disturbing result. They imply that the clocks at rest in S’ run slow because the standard of measure in S’ is different from the standard of measure in S. This contradicts the assumptions of the theory of relativity. In these experiments, the results were consistent with the statement in Einstein’s 1905 paper, that when a clock at rest in S is moved from space coordinate A in S to space coordinate B in S, the clock runs slow relative to the standard of measure in S during the motion. This result definitely is consistent with the idea that the standard of measure in S’ is different from that in S and experiment confirms it. But is also contradictory to the accepted interpretation of relativity that the change in standard of measure occurs only when measurement occurs across reference frames. So the theory is contradicted by the experimental results of the Haefle-Keating experiment.
The problem can be understood better in the following way. The theory of relativity assumes two different kinds of standards of measurement, one for length and another for time. There is a fallacy involving the standard of measure for time. The assumption is that as long as two clocks, call them S and S', are constructed identically and then tested to insure that they keep time identically, when one clock is at rest in S and the other at rest in S' that they both run at the same rate. Haefle-Keating shows that this assumption is not true for clocks. But it must be true for distance measure as long as rigid rods are used. Why? Because it is assumed that these retain their length when placed in motion in S', otherwise the proofs of Lorentz contraction across reference frames fail. So we have the contradiction that clocks have different measurement scales and distance measurement does not.

There is however an easy and consistent way to escape all of the contradictions discussed in this section. The solution is the subject of the following section.

Theorem: The meaning of the results of the sixteen equations given in section 4, interpreted in terms of rod lengths and times are contradictory.

12.0 The Fundamental Contradiction Theorem Of Relativity

The purpose of this section is to prove the fundamental contradiction theorem of relativity, which demonstrates in the most succinct manner that relativity is false. There are two things to prove. The first is that the 1905 interpretation of relativity is contradictory and then the second thing is to prove that the 1907 theory is contradictory. This approach is required because different assumptions underlie these two different versions of relativity.

Unfortunately, the previous statement is a simplification of the actual situation, because there has never been a clear distinction between these two different interpretations. Therefore, the distinction will made here. The interpretation referred to as the 1905 theory makes the following assumptions: 1. That the standards of measure are the same in S and S' and that clock dial readings are defined as time. 2. That the coordinates of measure are the same at rest when S and S' coincide. 3. The relativity postulate and the light velocity postulate are valid. 4. That the observers at rest in S and S' measure coincidences simultaneously in terms of their own clocks and distance scales. The interpretation given to the Lorentz transforms is that they define a change in measured quantities between reference frames.

The interpretation referred to as the 1907 theory makes the following assumptions:
1. That the standards of measure are the same in S and S’ and that time intervals or oscillation periods are defined as time. 2. That the coordinates of measure are the same when S and S’ coincide at t=t’=0 in motion. 3. The relativity postulate and the light velocity postulate are valid. 4. That the observers at rest in S and S’ measure the same objective events using the reference clocks and scales in their frames. The interpretation of the Lorentz transforms is that these transform the appearance of the measurements defined at rest into different measurements in motion.

The actual difference in these specifications relates more to the mathematical method used than it appears from the above description. The effective difference lies in the interpretation given to the resulting transformation equations after evaluation is performed. Notice that there is no specification regarding which evaluation condition is to be used and that the definition of time is different for the two theories.

The results for the 1905 theory are taken to be equations 6 and 4 for time and 11 and 13 for space or distance measure. The time transformations are interpreted as changes in the clock rate in the rest frames of measurement. So equation 6 means that the clock in the S’ frame is slow, while the interpretation of equation 4 means that the clock in the S frame is slow. This interpretation is consistent with the results of the Haefle-Keating experiment. Equations 11 and 13 are interpreted in terms of the Lorentz contraction hypothesis, which explains the null result of the Michelson-Morley experiment as a physical contraction of the experimental apparatus. Equations 6 and 4 are interpreted as inverse transformations so that equations 2 and 8 have no significance in this interpretation. Similarly, equations 11 and 13 are interpreted as inverses and equations 9 and 15 have no significance.

The results for the 1907 theory are taken as equations 2 and 8 for time and 11 and 13 for space. The time transformations are interpreted as apparent changes in the rate of the clock in S’ (S) when viewed from an observer at rest in S (S’). The distance transformations are interpreted as apparent changes in the size of objects at rest in frame S’ (S) when viewed or measured from S (S’). Equations 8 and 2 are interpreted as inverse transformations so that equations 6 and 4 have no significance in this interpretation. Similarly, equations 11 and 13 are interpreted as inverses and equations 9 and 15 have no significance. Notice that this is the usual theoretical interpretation of relativity, but that this is not consistent with the experiments mentioned above. This has given rise to the many different and conflicting interpretations that can be found in textbooks and the clock paradox debate. It is an irony that the elegant mathematical theory of 1907 is not consistent with experiments and that textbook writers have had to introduce the 1905 interpretation in order to be consistent with experiments.

12.1 The Fundamental Contradiction Theorem
Theorem: Given any true statement, deduced by a valid procedure in the theory of relativity, there exists another true statement, deduced by a valid procedure in the theory of relativity, that contradicts it. Hence the theory is contradictory and is false.

Proof: Divide the proof into two parts.

Part I. Take for the true statements of the 1905 theory the equations specified above. These are 6 and 4 for time and 11 and 13 for space.

Equations 6 and 4 are obtained by evaluating the Lorentz transform for time at \( x' = 0 \) and the inverse Lorentz transform for time at \( x = 0 \). We reverse evaluation to produce the contradictory true statements given in equations 2 and 8, which are obtained by evaluating the Lorentz transform for time at \( x = 0 \), and the inverse Lorentz transform for time at \( x' = 0 \). Equations 6 and 4 both give the result that the clock in the opposite reference frame runs slow according to the dial reading definition of time. Equations 6 and 4 both give the result that the clock in the opposite reference frame runs fast according to the dial reading definition of time. Hence, there is a contradiction.

Equations 11 and 13 are obtained by evaluating the inverse Lorentz transform for space at \( t = 0 \) and the Lorentz transform for space at \( t' = 0 \). We reverse evaluation to produce the contradictory true statements given in equations 9 and 15, which are obtained by evaluating the inverse Lorentz transform for space at \( t' = 0 \), and the Lorentz transform for space at \( t = 0 \). Equations 9 and 11 indicate that the observer in the opposite reference frame views the distances in the moving frame as contracted, while equations 9 and 15 give the result that they are dilated. Hence, there is a contradiction.

Part II. take for the true statements of the 1907 theory the equations specified above. These are 2 and 8 for time and 11 and 13 for space.

Equations 2 and 8 are obtained by evaluating the Lorentz transform for time at \( x = 0 \), and the inverse Lorentz transform for time at \( x' = 0 \). We reverse evaluation to produce the contradictory true statements given in equations 6 and 4, which are obtained by evaluating the Lorentz transform for time at \( x' = 0 \), and the inverse Lorentz transform for time at \( x = 0 \). Equations 2 and 8 both give the result that the clock in the opposite reference frame runs slow according to the time interval definition of time. Equations 6 and 4 both give the result that the clock in the opposite reference frame runs fast according to the time interval definition of time. Hence, there is a contradiction.

Equations 11 and 13 are obtained by evaluating the inverse Lorentz transform for space at \( t = 0 \) and the Lorentz transform for space at \( t' = 0 \). We reverse evaluation to produce the contradictory true statements given in equations 9 and 15, which are obtained by evaluating the inverse Lorentz transform for space at \( t' = 0 \), and the Lorentz transform for
space at $t=0$. Equations 9 and 11 indicate that the observer in the opposite reference frame views the distances in the moving frame as contracted, while equations 9 and 15 give the result that they are dilated. Hence, there is a contradiction.

Part I shows that true statements deduced to support the 1905 version of the theory are contradicted by other true statements, hence they are false. Part II shows that true statements deduced to support the 1907 version of the theory are contradicted by other true statements, hence both versions of the theory are false. QED

The reader who objects that the theorem must be false, should take notice of the following. There was no justification for the selection of the method used to prove the statements deduced in support of the 1905 and 1907 versions of the theory. Therefore, there can be no objection to the procedure used to deduce contradictory statements.

13.0 Analysis and Commentary On Results

This paper has shown by a rigorous mathematical method that the conclusions of Einstein’s special theory of relativity with regard to the kinematics of space and time are false. This result should not be surprising because these conclusions have been constantly criticized and been the cause of acrimonious argument and debate. The simultaneous existence of at least two different interpretations of the theory, as well as others with a minority viewpoint, has also been the source of confusion and argument. Here it will be considered why this situation has existed for so long without being resolved.

The answer is multifold. First, there has never been a rigorous analysis of Einstein’s methods and procedures. The fact that he based his conclusions in 1905 upon incorrect derivations of the transformation equations has never been revealed. The conclusions are inconsistent for the deduction of time dilation and space contraction. Different methods and assumptions are used and the conclusions are stated in a confusing and vague way. In 1907, Einstein tried to make the theory consistent by revising his statements regarding the interpretation of time dilation. But, he obtained the incorrect result $t=\beta t'$ instead of the correct result $t'=\beta t$. This blunder has caused quite a lot of confusion in the textbooks when trying to interpret the experimental results.

In the following years, different interpretations were introduced in order to be consistent with experiment and the spirit of Einstein’s theory. The result has been a morass of confusion. Different textbooks giving different explanations and none of them really being consistent or contradiction free. The problem has been that the errors in the theory have never been clearly understood and excised.

The argument presented here is that because there was no careful analysis of the correct methods and procedures, the mistakes and errors were allowed to stand and
propagate into textbooks for 100 years. It is time to clear up this mess.

13.1 Towards The Correct Theory Of Relativity

The mathematical procedure used here and termed evaluation, has derived all of the solutions for the Lorenz transforms for the first time. It is clear that any theory of relativity must be consistent with all of these equations without contradiction. Hence, any successful theory must face the problem of contradiction and not avoid it by declaring contradictions paradoxes.

In the past, theoretical workers have derived a subset of the 16 equations and attempted to build a theory around this subset of solutions. Lorentz did this using only one evaluation and the result is a theory applicable to the aether interpretation. Einstein obtained another subset and interpreted this in terms of his idea that there was no absolute rest frame. But, this idea is so lacking in rigor that we can prove anything we choose by selection of an evaluation procedure that yields the desired result. There are no rules in relativity to govern the choices used. Relativity further abuses rigor by changing the meanings of the symbols used to suit whatever interpretation is required to prove the desired point. Hence, the theory is seriously flawed.

One result of this paper is the demonstration that a lack of rigorous mathematical procedure is the problem in relativity. It has allowed many different and spurious interpretations of relativity to coexist as the theory of relativity and cause confusion. It has also confused the interpretation of experimental verification, because any result can be shown to be consistent with the theory when there is no rigor to the proofs. This has actually happened, so we can no longer trust the claims that experiments support relativity.

The only way that this problem can be resolved is to produce a rigorous theory which is consistent with the evaluation equations of section 4.0 without contradictions. This only seems possible if the slate is swept clean and a new theory is developed from scratch.

14.0 Conclusions

The primary purpose of this paper was to examine the meaning of the Lorentz transformation equations within the context of the traditional viewpoint of Einstein’s theory of relativity. As discussed in section 2.0, the interpretation of these equations has never been consistent. Different interpretations and approaches were used by Einstein and others to explain “special relativity.” These different viewpoints and interpretations have been the source of the confusion, argument, and debate about relativity. The primary contribution of this paper to the ongoing debate has been the introduction of a new method of mathematical analysis.
The primary achievement of the new method has been the discovery of errors in Einstein's fundamental papers. This was accomplished by the introduction of mathematical rigor and proof into the analysis of the claims and assertions of relativity. The two fundamental errors in Einstein's papers were the incorrect conclusions regarding time dilation (see section 8.0) and length contraction. The equations obtained for time dilation were derived incorrectly, and the proof of length contraction is false. The correct result is length dilation.

Another major achievement was the clarification of the main methodological defect of Einstein's theory. This defect is that there is no way to determine within the structure of the theory whether a particular theoretical deduction or statement of the theory is true. For every true statement, there is another one which contradicts it. This situation results from the relativity postulate, which claims there is no absolute rest frame. Hence, all frames are equivalent, and the result when implemented mathematically is a system which is self contradictory. It is an inherent mathematical flaw that the different interpretations of relativity have sought unsuccessfully to remove. In this paper it is shown that this is impossible. Einstein's Theory Of Relativity is inherently a contradiction.

The new method of evaluation has made it possible to investigate each of the many different interpretations of relativity is a mathematically rigorous way. This has been done in this paper with the result that all of these different ways of viewing the evaluation of the Lorentz transforms leads to a contradiction. Hence it clear that the results of the Fundamental Contradiction Theorem can be extended to be a generalized truth. For every true statement in the theory of relativity, there exists another true statement that contradicts it. So it is concluded that the theory is false.

References


Here the contradiction refutes the assumption that rest observers see events at the same coordinates of time and space when at rest is refuted by the solutions obtained from the evaluation of the Lorentz transforms in section 4.0. The 1907 interpretation of relativity stated above; ie, that the transformations of distance and time are only apparent to the observers in the opposite reference frame, is false.