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RATIO OF INDEFINITENESS IN THE RELATIVE PHYSICS

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Abstract

There is an objective impossibility (prohibition) for simultaneous accurate measurement of length and time in nature. When the length is exact, the time is approximate and back when the time is exact, the length becomes approximate. The Ratio of indefiniteness confirms the Second postulate only in the part that the speed of light is a constant with a limit value **c** . Respectively, it refutes the **S**econd postulate in the assertion that, as path and time, the directions "going" and "return" of the light signal always (in all systems) are fully equivalent. The Second postulate, as defined in the Special Theory will is entirely valid only in an absolutely stationary system. In this sense the ratio **exact length/exact time**, what offers us the Theory thanks to the in question postulate, can be achieved solely in the ideal (real inaccessible) conditions of this system. In other words, the Theory denies its existence, but in practice use it for their conclusions. The Ratio of indefiniteness speaks in support of the conclusions of the Special theory that the moving length and time are changing. Conversely, these findings of the Theory are argument for the veracity of the Ratio of indefiniteness. The same finds confirmation in the experimental results (Roemer – 1676, Sagnac – 1913 and others whose contemporary interpretation is wrong).

Keywords: *length, time, special theory, second postulate, ratio of indefiniteness*

INTRODUCTION

The realization of Cognition in cognitive closed contours is a natural law (Theory of the Cognition: attainment of Cognition in an open configuration is not possible). [1] We will present this circular order in the traditional method for measurement of speed in which should fits and the measuring of the speed of light.

EXPOSITION

As is known, the measurement of speed, including that of light (for now we disregard the Second postulate of the Special theory) based on two bases - spatial and temporal, respectively, of a measured

length **L** and the time **t** for its covering. Demonstration of such a measurement we will do in the treatment:

Test piece - inertial system **K'**, with center **O'**, is moving towards a stationary system **K** with center **O**, to right with some kind of velocity **v** along the axes **X'=X** . Again to right on the X' and X, are the points marked A' and A, so that, with peace of the systems relative to one another, is available the identity length **L'** (distance **O'A'**) = length **L** (distance **OA**).

The so configured task has emerged in several variants of presentation.

1a) Measuring in system **K** with a clock at point **O** and a base length **L** :

We (with the clock) are at point **O**. When point **O'** coincides with **O**, we start the clock, fixing the moment of making of the body-system **K'** in the control length **L**. Follows a coincidence of point **O'** with the ultimate point **A** . This is the moment at which we have to stop the clock, shooting on the necessary time **t** for covering of length **L** . However in reality we cannot do that, because the event of overlapping **O'=A** remains hidden to us. (**OA** is an open configuration, so that it is invisible from point **O**).

The manner to overcome the problem is clear – we need to use an auxiliary light signal, which going back to point **O**, to notify us about the event **O'=A** (which to close the cognitive contour)**.** Exactly this later point in time we will mark as end of the measurement. Another possibility does not exist.

And so going **OA** becomes for the exact time **t**, which cannot be registered. Is why at the moment **O'=A** light signal is emitted to point **O**. The same covers our way back **AO** for the additional time **Δt**. I.e., for covering the exact length **L**, the clock actually will show no the real time **t**, but only the accessible time **t* = t + Δt** for measuring. Time **t*** in fact is approximately, incorrect time **t**. Difference **Δt** is infinitely small due to boundary speed of light. But theoretically it enters the account. In this sense, about the velocity **v** we receive:

v = exact length L/inexact time t – the possible, the actual measurement

(**v = exact length L/exact time t** – this measurement is impossible)

1b) Measuring in system **K** with a clock at point **O** and a base time **t***:

If we take for base the real measured time **t***, while it passes, system **K'** should cover, except the measured length **L**, also and one additional length **ΔL**, corresponding to extra time **Δt**. I.e., in the real measured exact time t*, **K'** will be located at the corresponding of **t*** exact length **L* = L + ΔL**. But now there is no way to capture this exact length **L***. In a word, we have no other possibility but to work with the initially metered length **L**, which is an approximate, inexact length **L***. Or, in the case, for the velocity **v** we get:

v = inexact length L*/exact time t* – the possible, the actual measurement

(**v = exact length L*/exact time t*** – this measurement is impossible)

Thus, we arrive at the following important conclusion:

In the Nature, there is an objective impossibility for simultaneous accurate measurement of length and time. When the length is accurate, the time is approximate and back when the time is accurate, the length becomes an approximate (the same regularity we see in quantum mechanics – Heisenberg 1927).

We should emphasize expressly that the **inexact time t**, with **exact length L**, as well as **inexact length L*** at base, **exact time t***, do not come from the fact that the quantities **Δt** and **ΔL** are infinitely small and there is no technical possibility of their measurement. Here the case in point irresistible natural law.

For demonstrativeness, we will show its action in an example of engineering theory and practice in machinery construction. The case in point absolute impossibility to realize exact positioning (assembly) of details simultaneously at two bases. If we achieve precision one, the other will inevitably remains free.

More specifically, let upon the two rungs of single detail to be mounted the same tiered concrete structure of a second detail. In whatsoever ultimate precision to be drawn up the two details, the second can never be in contact simultaneously with both surfaces of the first. There will always lie snugly on the one, and will be with gap on the other. This is a principled situation. In real circumstances the attitude **tightly/tightly** (**exactly/exactly**) is impossible (as, of course, the pending position **clearance/clearance**).

In the practice, if one of the two bases is not a purposely with clearance (or compensated with a soft tool tray – gasket), is obtained a irregular action of the piecing together, with subsequent deformation and fracture. To avoid such a technical untenable (unintelligent) installation are prescribed relevant assumptions of preparing the details. It is take a base or the shaft (system "main shaft") – in the physics base "length" and the philosophy base "materially", or aperture (system "main aperture") – in the physics base "time" and the philosophy base "ideally". Looked at in depth the constructor is obliged to provide the opposites "tightly, matching exactly against freely, loosely, inaccurate." Looked at in depth the constructor is obliged to provide the opposites "**tightly, adjusted, exactly** against **freely, loosely, inaccurate**".

It should be abundantly clear that the World is structured on the Principle of opposites, which precisely is played back in the lower levels of community – from the laws of physics to the concrete practice. In this sense, in the reality the differences are in force, ergo, the asymmetry. [2]

But to continue with the variants.

2a) Measuring in system **K** with a clock at point **A** and a base length **L** :

We (with the clock) are at point **A**. In this case, there is no way to mark either initial moment **O'=O**, in which the body-system **K'** is making to the control length **L**. The same remains hidden to us.

And now the way to overcome the problem is clear - we need to use an auxiliary light signal, which emitted to point **A** in the moment **O'=O**, will notify us about this event. To its arrival at A, how-

ever, passes time Δt. Barely this latter moment we will mark like the beginning of the measurement, starting the clock. Then comes the coincidence O'=A, in which final moment, closing the temporal contour, we stop the clock, fixing the real time **t***. Another possibility for carrying out the measurement does not exist. That is, to cover the exact length **L**, the clock will not register the true time **t**, and the only accessible for measuring time **t* = t - Δt**. Factually time **t*** is approximate, inexact time **t**. Thus, for the velocity v again we get:

v = exact length L/inexact time t – the possible, the actual measurement

(**v = exact length L/exact time t** – this measurement is impossible)

The case 2b) "Measuring in system **K** with a clock at point **A** and a base time **t***" is similar to 1b) and we shall not dwell on it.

3a) Measuring in system **K** with a clock at point B, a bisecting the line segment **OA**:

This case is a combination of the previous two. We (with the clock) are at point **B** situated in the middle of the line segment **OA** – **part 1 (OB) = part 2 (BA)**. It is clear that now we should receive a subsidiary messages and about the start of the measurement (the moment **O'=O**), and about its finale (the moment **O'=A**).

The signal for the initial event **O'=O** will arrive in point **B** with a delay Δt_1 , at which moment we start the clock. The signal for the final event **O'=A** will arrive in point **B** with a delay Δt_2, at which moment we stop the clock. Thus, to covering the exact length **L**, we will measure the real time $t^* = t - \Delta t_1 + \Delta t_2$, where $t = t_1 + t_2$. And as usual, **t*** represents approximate inexact **t** , which fact repeats the result:

v = exact length L/inexact time t – the possible, the actual measurement

(**v = exact length L/exact time t** – this measurement is impossible)

And here we will not dwell on the case 3b) – **inexact length L*/exact time t ***.

This formulation is of particular interest in that into it the two auxiliary light signals are in opposite directions – the first carried out "going" and the second "return".

According to the Ratio of indefiniteness, times Δt_1 and Δt_2 will be different, which means that the path "going" (**OB**) and the path "return" (**AB**) of the light signal cannot be equal (bearing in mind that the system **K**, with the line segment **O(B)A** is stationary only for system **K'**, and otherwise, in the general case, moves relative to all other systems). That same asymmetry is confirmed by the observations of Roemer – 1676, as well as from the experience of Sagnac – 1913 (and others whose contemporary interpretation is wrong). And all this we know is against the outside experienced assertion of the Second postulate $\Delta t_1 = \Delta t_2$ (the same will be in force only if the system **K** is in an absolute piece). [3]

In a word, in cases 1), 2) and 3) the Ratio of indefiniteness is not coordinating with the Second postulate. Now we will show the conversely in cases 4) and 5).

4) Measuring of line segment **OA** (length **L**) with a clock accompanying the body-system **K'** (with a clock at point **O'** on **K'**) – base length **L**:

It is obvious that the clock for measuring the time have a possibility to accompany the body from start to final. In this way the same with certainty and absolute precision will capture and the initially moment **O'=O**, and the final moment **O'=A**. Now, however, of the exact length **L** will meet not the required exact time **t**, but the measured exact time **t'**.

According to the Ratio of indefiniteness between the times **t'** and **t** there will be a difference. As we know, this difference is found by the Special theory, thanks to the Second postulate. I.e., exact time **t'** is approximate, inexact time t, so that again is available the condition:

v = exact length L/inexact time t – the possible, the actual measurement

5) Measuring of line segment **O'A'** (length **L'**) with a clock at point **O** of system **K** – base time **t**:

And now the clock for measuring the time with absolute precision will mark and the initially moment **O=A'**, and the final moment **O=O'** of the line segment **O'A'**. This time, on the measured exact time **t** will meet not the required exact length **L**, but the measured exact length **L'**.

According to the Ratio of indefiniteness between the lengths **L'** and **L** there will be a difference. As we know, this difference is found by the Special theory, thanks to the Second postulate. I.e., exact length **L'** is approximate, inexact length **L** , so that again is available the condition:

v = inexact length L/exact time t – the possible, the actual measurement

In a word, in cases 4) and 5) the Ratio of indefiniteness is coordinating with the Second postulate.

CONCLUSION

Ultimately, the careful analysis of the situation suggests the findings:

– The Ratio of indefiniteness confirms the Second postulate only in the part that the speed of light is a constant with a limit value **c** . Respectively, it refutes the **S**econd postulate in the assertion that, as path and time, the directions "going" and "return" of the light signal always (in all systems) are fully equivalent (fundamentally identical).

– The Second postulate, as defined in the Special Theory will is entirely valid only in an absolutely stationary system...will relate precisely and only for her. In this sense the ratio **exact length/exact time**, what offers us the Theory thanks to the in question postulate, can be achieved solely in the ideal (real inaccessible) conditions of this system. In other words, the Theory denies its existence, but in practice use it for their conclusions.

– The Ratio of indefiniteness speaks in support of the conclusions of the Special theory that the moving length and time are changing. Conversely, these findings of the Theory are argument for the

veracity of the Ratio of indefiniteness. As we stated, the same finds confirmation in the experimental results (Roemer – 1676, Sagnac – 1913 and others). [4]

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