The Falsification of Special Relativity

Octavian Balaci

23 June 2015 , tavib72@mail.com

Abstract

Reassert the twin paradox in a new light, leading to the conclusion that the theory of relativity is inconsistent with the physical reality. Symmetric clocks paradox using two clocks in a special setup, in which both clocks are in inertial movement on the entire duration of experiment.

1 The Clocks Paradox

The clocks paradox also known as the twins paradox is a direct consequence of the symmetry of the relativity principle in the context of constant light speed principle. One consequence of special relativity, among others, is the time dilation witch imply that in a relative moving inertial frame with respect to a reference frame, the coordinate time intervals become larger compared with the proper time intervals in the moving frame and consequently the clocks run slower than the clocks from the reference frame. The theory of relativity claim that this is a real physical effect which affect the proper time of the relative moving system compared with the proper time of the reference system which is equal with the coordinate time. Also a number of experiments seem to indicate that this is a real effect. In consequence a relation between the proper time intervals counted by two clocks in relative movement to each other must exist and this relation must be consistent in any valid analysis of special relativity, from any valid inertial frame.

The root of the problem is that while relativity principle is active, we cannot have a sense of which is in motion, instead any group of inertial systems can be considered in motion relative to each other. Is not dificult to see that this situation will lead to inconsistent predictions.

1.1 The Classic Twins Paradox

Is the well known case of twins paradox, or clocks paradox, the original two clocks (twins) variant is pretty useless because imply accelerations and fall outside the scope of special relativity, which leave room for various interpretations. Lets suppose we have two clocks A and B, initialy both clocks are in the same reference frame having the same state of motion. The clocks counters are cleared to 0 and the clock B is accelerated at the speed v with respect to the clock A which remain in the same state of motion. After a while the clock B stop and it turning back with the same speed v with respect to the clock A, until it reach the clock A and the clocks counters are compared. Analyzing the problem from the clock A reference frame, which is a valid inertial reference frame on the entire duration of experiment, will result that the clock B has lag behind the clock A due to the kinetic time dilation caused by the moving of B with respect to A. However the same analysis can be made from the clock B reference frame, which see that the clock A is moving with respect to B and consequently the clock A will lag behind the clock B due to time dilation. However the problem is that the clock B experience accelerations and change reference frames on the duration of experiment and consequently is not a valid reference frame from the point of view of special relativity. As result this case cannot be considered a clear paradox of special relativity.

2 Symmetric Clocks Paradox

In this case the acceleration is eliminated with the purpose to create a symmetric version, where both clocks reside in inertial systems on the entire duration of experiment and are equally entitled to be used as reference frames. Lets suppose we have two very long rods, every rod have a clock at one end and a marker at the other end. The marker (e.g. a small magnet) can be sensed by an appropriate sensor embedded in each clock, when the clock pass near it. Also both clocks can sense the proximity of the other clock by an appropiate sensor ambedded in each clock. Now these two rods are already in motion with respect to each other with the velocity v on an approaching trajectory with the clocks in the front of movement direction, like in figure 1. We arbitrary name them rod A and rod B, however the analysis is symmetrical.

After a while both clocks arrive in the proximity of each other, like in figure 2, which represent the zero syncronization moment. This moment is simultaneous for both clocks, they having virtually the same position in

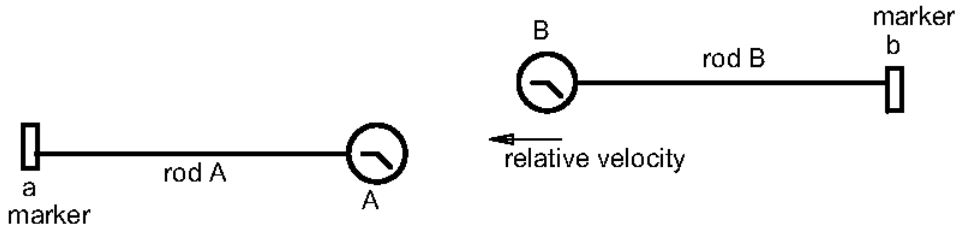

Figure 1: Initial setup of rod A and rod B

space. At this moment both clocks reset their counters to zero, so we will call it the zero moment. This is the starting moment of our experiment.

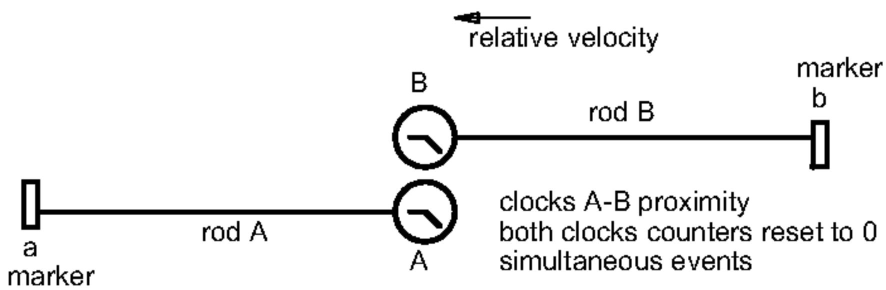

Figure 2: Zero syncronization moment

After a time interval the clock B will arrive in the proximity of marker a , like in figure 3. In a similar way the clock A will arrive in the proximity of marker b .

When the clock B arrive in the proximity of marker a , two simultaneous events happens: first a light pulse is send toward the clock A by the clock B and second the clock B memorize its counter. Similar events happens when the clock A arrive in the proximity of marker b . The light pulse sent from the position of marker a will arrive at clock A after a delay, expressed as proper time of A, equal with L/c where L is the lenght of the rods. When receiveing this light pulse, the clock A will memorize its counter and then will substract from this memorized value the known value of the light pulse delay. In this

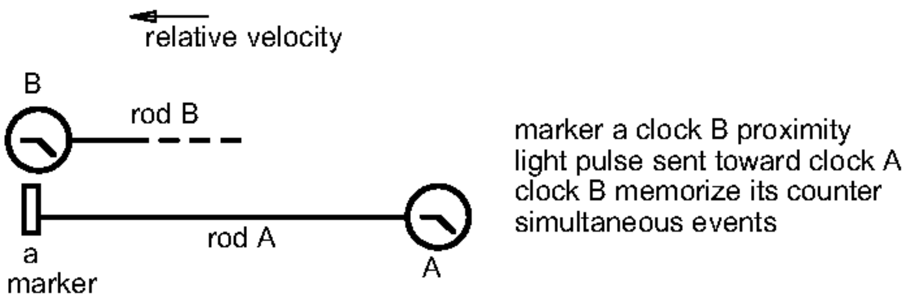

Figure 3: Marker a proximity moment

way the clock A have the value of its own counter at the moment of marker a clock B proximity, moment simultaneous with the memorize of the clock B counter. In consequence the clocks A and B proper times, accumulated between the zero moment and marker a clock B proximity, can be compared. Similar events happen in the clock B when it receive the light pulse from the clock A, allowing comparition of the proper times of clocks.

After this the experiment ends, the memorized values can be compared using any practical method, by radio communication, or by bringing the clocks together, the experiment being over now. As can be observed, both clocks remain in an inertial moving state on the entire relevant duration of experiment, in consequence both clocks are entitled to be used as refrence frame. We will use

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

Interval 0 to aB proximity using rod A as reference frame. The clock A will count the proper time of itself until the clock B reach the marker a , as

$$\tau_{aA} = \frac{L}{v} = t_{aA} \tag{1}$$

The proper time counted by the clock B, considering the time t_{aA} dilation for the moving clock B, will be

$$\tau_{aB} = \frac{t_{aA}}{\gamma} = \frac{L}{v\gamma} \tag{2}$$

Interval 0 to aB proximity using rod B as reference frame. The clock B will count the proper time of itself until it reach the marker a , considering the lenght of the moving rod A contracted, as

$$\tau_{aB} = \frac{L}{\gamma v} = t_{aB} \tag{3}$$

which is identic with (2). However, considering the time t_{aB} dilation for the moving clock A, result

$$\tau_{aA} = \frac{t_{aB}}{\gamma} = \frac{L}{\gamma^2 v} \tag{4}$$

which is not consistent with (1). Because the proper time intervals are counted between the same two points which are simultaneous in both frames, zero moment and marker a clock B proximity, result that the clock A run both slower and faster than the clock B. This result is clearly not possible in reality, indicating logical contradiction.

Interval 0 to bA proximity using rod B as reference frame. The clock B will count the proper time of itself until the clock A reach the marker b , as

$$\tau_{bB} = \frac{L}{v} = t_{bB} \tag{5}$$

The proper time counted by the clock A, considering the time t_{bB} dilation for the moving clock A, will be

$$\tau_{bA} = \frac{t_{bB}}{\gamma} = \frac{L}{v\gamma} \tag{6}$$

Interval 0 to bA proximity using rod A as reference frame. The clock A will count the proper time of itself until it reach the marker b , considering the lenght of the moving rod B contracted, as

$$\tau_{bA} = \frac{L}{\gamma v} = t_{bA} \tag{7}$$

which is identic with (6). However, considering the time t_{bA} dilation for the moving clock B, result

$$\tau_{bB} = \frac{t_{bA}}{\gamma} = \frac{L}{\gamma^2 v} \tag{8}$$

which is not consistent with (5). Because the proper time intervals are counted between the same two points which are simultaneous in both frames, zero moment and marker b clock A proximity, result that the clock B run both slower and faster than the clock A. All these results show that, when the principle of relativity is rigorously applied, the theory of relativity become unable to make consistent predictions about what is happened with the two clocks. In consequence the theory of relativity cannot be considered a valid theory of physics.

Because the space-time kinetic properties defined by special relativity is inconsistent, leading to logical contradictions, the idea of space-time curvature also become inconsistent and with it the theory of general relativity become false too. In this conditions the concepts of space and time must return to their original purely abstract nature independent by any physical phenomenons or entities.

Because the special relativity was introduced as resolution for the electrodynamics problem of not being invariant at Galilean transformations, a new resolution must be found. The observation that light is deflected by gravity may indicate that the gravitation have influence over the elctromagnetic properties of vacuum, leading to gravitational refraction of light. A model which interpret the electrodynamic and gravitational phenomena based on this assumption is found in [9].

References

[1] Albert Einstein (1905) On the Electrodynamics of Moving Bodies

[2] Albert Einstein (1922) Sidelights on Relativity

[3] William H. McCrea (1951) The Clock Paradox in Relativity Theory

[4] Herbert Dingle (1956) A Problem in Relativity Theory

[5] Luis Essen (1971) The Special Theory of Relativity: A Critical Analysis

[6] Tom Van Flandern (1998) The Speed of Gravity - What the Experiments Say , Physics Letters A, 250 (1998) 1-11

[7] Milan R. Pavlovic (2000) Einsteins Theory of Relativity - Scientic Theory or Illusion?

[8] Ling Jun Wang (1999) Symmetrical Experiments to Test the Clock Paradox

[9] Octavian Balaci (2013) Connection Between Gravity and Electromagnetism