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Length Contraction Interpreted by Human Visual Memory Instead of Special Relativity

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[Abstract]
Length Contraction is interpreted by human visual memory instead of Einstein's special relativity. The mechanism of an interactive observation by optical sensor or human eyes is studied. The concept "Same Time" in observation process is explained. As a result, in compliance with human visual memory, length contraction along the object can be recognized with different traveling speeds and angles. In addition, length expansion can also be observed along the direction away from the object.
[Keywords]
Length Contraction, Special Relativity, Velocity Time Dilation, Vision of Object, Vision of Light, Principle of Vision, Theory of Vision, Photon Inertia Transformation, Absolute Light Speed, Inertia Speed, Equation of Light Speed, Human Visual Memory.

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I. Observation and Measurement

The length and time as well as all the properties of an object or event can be observed (coordinated) by a reference system based on a reference point with three perpendicular axes and a reference time, and also to be measured by a unit length and a unit time. The reference system must be fixed at all time. In other words, the position of the object and the time of the event must be measured by a fixed reference system (a fixed reference point with three fixed perpendicular axes and a fixed reference time) at all time. Even if it has to superimpose the reference point and the three perpendicular axes at different time frames to the same position and orientation. Also time must be measured with the object onsite in real time, so as to avoid any time delay caused by information transfer process.

Different unit length and unit time can be used for measurement subject to the applications, such as normal unit system (MKS or CGS) and Wu's unit system (l_{yy}, t_{yy}). Since Wu's Pairs are the building blocks of the universe, all unit systems are functions of local gravitational field and aging of the universe. In other words, unit length and unit time are dependent on the reference point (system). Even more, Wu's Unit Length l_{yy} and Wu's Unit Time t_{yy} are correlated to each other by Wu's Spacetime Equation $t_{yy} = \gamma l_{yy}^{3/2}$.

There are two types of observation (measurement): (1) Coordination at a fixed reference point (system) – a passive approach always with the same result no matter of the observers (optical sensor and human eyes). (2) Observation by optical sensor or human eyes – an interactive approach involving optical signal (photon) receiving and processing and with a result subject to the observers.

II. Absolute Space System

A reference system contains a reference point and three perpendicular axes, with the reference point as the origin of the three axes. In general, a reference system has a fixed position and orientation based on an object. But, in the real universe, everything is moving with each others. There is no such thing as a fixed reference system. However, when a photon is emitted from a light source, it generates a straight optical path from its light origin (not light source) into space. The light origin has an absolute fixed position in the space that doesn't move with the light source, nor the earth or anything else. Therefore, an Absolute Space System [1] can be defined by a light origin and three fixed perpendicular axes, each point out to a far distance star (such as North Star) from the light origin.

Time is always the same no matter where it is in the universe. Therefore, onsite real time is used in the Absolute Space System. As to the measurements, different unit quantities can be used for the Absolute Space System. Because all unit quantities are composed of Wu's Pairs, they are subject to change with local gravitational field and aging of the universe.

III. Vision of Object

An object is observed by an observer at a reference point (system) means the position, direction and time (coordination) of the object related to the reference point (system) is measured by a unit length and a unit time at the reference point (system). Keep in mind here the observer is totally irrelevant. "Vision of Object", on the other hand, is the image of an object observed by an observer at a reference point (system) during a period of time. In other words, "Vision of Object" is a group of pictures represents the correlation between an object and a fixed reference point (system) defined by the distance and direction (or coordination) of the object related to the fixed reference point (system) in a period of time.

Beside direct observation, the vision of object at a new reference point (system) can be obtained by a standard transformation process from an existing vision of object at another reference point (system).

IV. Principle of Vision

The relative positions and directions between two objects shall maintain unchanged no matter the reference points (systems). In other words, one object observed by the other object maintains the same distance and direction (coordination) no matter the observation of the two objects by any third reference point (system). This phenomenon is named "Principle of Vision" [2].

V. Theory of Vision

Based on Principle of Vision, a vision of object, in spite of observed directly at a reference point (system), can be constructed from the correlations between the object and the reference point (system) in each time frame observed at the third reference point (system). A vision of object can be produced by superimposing the object observed in each time frame at the third reference point (system) by overlapping the reference point (system) observed in each time frame at the third reference point (system) perfectly on top of that in other time frames, while keeping the same relative position and direction between the object and the reference point (system) as that observed at the third reference point (system). This is named "Theory of Vision" [2].

Two schematic diagrams are illustrated here to explain the construction process of vision of object from one reference point (system) to another reference point (system):

Fig. 1 shows the vision of an object observed at reference point O. Object t_1, Object t_2 and Object t_3 represent the positions and directions of the object; and Observer t_1, Observer t_2 and Observer t_3 represent the positions and directions of the observer, observed at a reference point O in the time frame t_1, t_2 and t_3 respectively. The curve from Object t_1 to Object t_2 and Object t_3 represents the vision of the object observed at reference point O during the time period from t_1 to t_3.

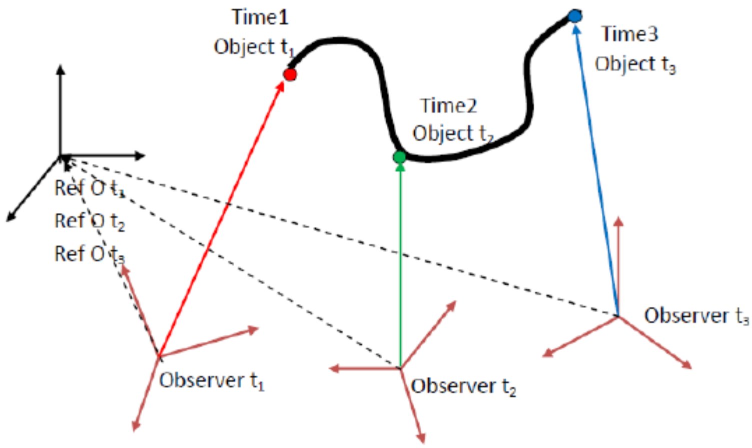

Fig. 1 Vision of an object observed at a reference point.

Fig. 2 shows the vision of object constructed at the final position of the observer (Observer t_3 in Fig. 1). In which, Observer t_1, Observer t_2 and Observer t_3 and their coordination systems are completely matched and overlapped on top of Observer t_3. The same relative positions and directions of the Object t_1, Object t_2 and Object t_3 with respect to Observer t_1, Observer t_2 and Observer t_3 are maintained as is observed at reference point O in Fig. 1. Thus a curve from Object t_1 to Object t_2 and Object t_3 representing the vision of object observed by the observer (the third reference point (system)) during the time period from t_1 to t_3 can be constructed.

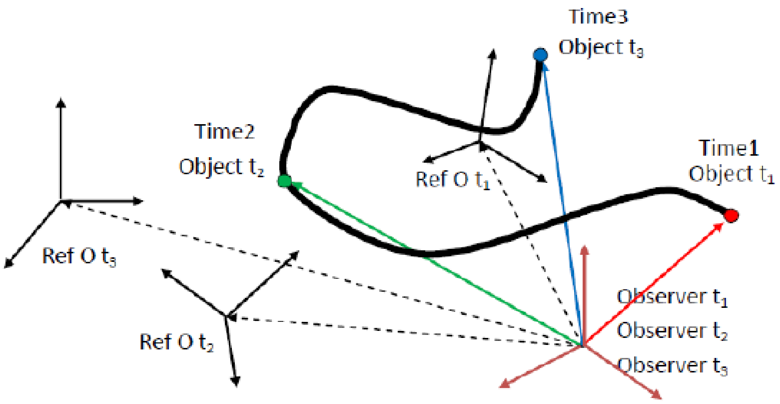

Fig. 2 Vision of an object observed at an observation point constructed from a reference point.

VI. Vision of Light

Like vision of object, "Vision of Light" [1][2] is the image of a photon observed at a reference point (system) during a period of time. The photon is correlated to the reference point (system) by distance and direction (or coordination).

Similar to vision of object, in spite of observed directly at a reference point (system), Vision of Light can be constructed by superimposing the images of the photon and the reference point (system) observed at the light origin in the Absolute Space System. The reference point (system) of each time frame is overlapped on that of the final time frame. Also, the relative positions and directions between the photon and the reference point (system) are maintained as is observed at the light origin in the Absolute Space System.

Speed of object (photon) is defined by the traveling distance of an object (photon) divided by the traveling time of the object (photon) measured at a reference point (system). Because the traveling distance of an object (photon) is measured based on the Vision of Object (Vision of Light) observed during a period of time at a reference point (system), therefore, like speed of an object is calculated by Vision of Object divided by the traveling time of the object, light speed can also be calculated as the Vision of Light divided by the traveling time of the photon measured at a reference point (system).

Fig. 3 shows a schematic diagram of the Visions of Light of an emitted photon observed at the light origin, ground and light source in Absolute Space System at light origin (reference point). Because of the motions of earth ($\mathbf{V_E}$) and the light source ($\mathbf{V_C}$) with respect to the light origin, ground and light source are drifted away from the light origin respectively. Assuming all motions are at constant speeds and axes, after a time interval Δt, the Visions of Light can be represented by the following straight lines: **AP**–the Vision of Light observed at light origin (black line), **BP**–the Vision of Light observed at ground (red line) and **CP**–the Vision of Light observed at the light source (green line) respectively. They all have the same final position (point **P**) of the emitted photon.

AP (Vision of Light observed at light origin) is the vector summation of **CP** (Vision of Light observed at the light source) and **AC** (moving path of the light source from light origin). Also, $\mathbf{C_O}$ (light speed observed at light origin) is the vector summation of $\mathbf{C_S}$ (light speed observed at the light source) and $\mathbf{V_C}$ (moving speed of the light source from light origin).

$$\mathbf{AP} = \mathbf{CP} + \mathbf{AC}$$
$$\mathbf{C_O} = \mathbf{C_S} + \mathbf{V_C}$$

Similarly, **BP** (Vision of Light observed at ground) is the vector summation of **CP** (Vision of Light observed at the light source) and **BC** (moving path of the light source from ground). Also, $\mathbf{C_E}$ (light speed observed at ground) is the vector summation of $\mathbf{C_S}$ (light speed observed at the light source) and $\mathbf{V_S}$ (moving speed of the light source from ground).

$$\mathbf{BP} = \mathbf{CP} + \mathbf{BC}$$
$$\mathbf{C_E} = \mathbf{C_S} + \mathbf{V_S}$$

Because of the constant repulsive force generated between photon and the adjacent Wu's Pairs on the surface of the light source in the photon emission process, a constant light speed $\mathbf{C_S}$ (Absolute Light Speed $3\text{x}10^8$ m/s) in the photon ejection direction can always be observed at the light source regardless of the frequency of the photon neither the moving speeds of the light source from light origin or ground ($\mathbf{V_C}$ or $\mathbf{V_S}$).

When a photon observed at different observation points, the traveling time of the photon is the same ($\Delta t_E = \Delta t_S = \Delta t_O$) observed onsite in real time, but the Vision of Light is different (**AP** ≠ **BP** ≠ **CP**). Since light speed is measured as the Vision of Light divided by the photon traveling time observed at the observation point, therefore the light speeds are different ($\mathbf{C_E} \neq \mathbf{C_S} \neq \mathbf{C_O}$) at different observation positions. These oppose to Einstein's Special Relativity [3] wherein he claimed that light speed is always constant no matter light source and observer (reference point).

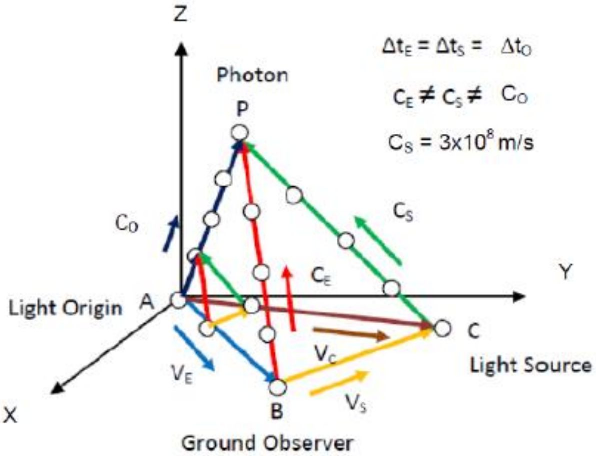

Fig. 3 Visions of Light of an emitted photon observed at the light origin (black line), ground (red line) and light source (green line) in Absolute Space System.

VII. Equation of Light Speed

When a photon emitted from a light source, it undergoes Photon Inertia Transformation and travels with two motions: ejection motion and inertia motion. In other words, the light speed (C') observed at any observation point is a vector summation of the Absolute Light Speed 3 x 10^8 m/s (C), the moving speed of the photon away from the light source observed at the light source, and the "Inertia Light Speed" (V), the moving speed of the light source away from the reference point (observer or his inertia system). This theory is named "Equation of Light Speed" [2].

$$\mathbf{C' = C + V}$$

Where **C'** is the light speed observed at any observation point, **C** is the Absolute Light Speed 3 x 10^8 m/s and **V** is the Inertia Light Speed (moving speed of the light source away from the reference point (observer)).

VIII. Light Speeds by Observations

The speed of light is calculated by the Vision of Light divided by the traveling time of light. Since different Visions of Light of a photon can be observed by observers (reference points) at different moving speeds and directions, it is obvious that different light speeds in space can be observed by moving observers (reference points) other than those at the light source. As shown in Fig. 3, in addition to the Absolute Light Speed C_S (3 x 10^8 m/s) observed at the light source, light speeds C_E and C_O can also be observed at ground and light origin respectively. This is different from that of Einstein's Special Relativity, which claims that light speed in space is always constant, no matter the directions and speeds of the light sources and observers (reference points).

Furthermore, if an observer (reference point) moves at a speed as fast as the Absolute Light Speed, in the same direction of the light beam, then the light speed observed by the moving observer (reference point) can be as small as zero. In other words, the photon is frozen or idles with respect to the observer (reference point) [2].

Because,

$$\mathbf{C' = C + V}$$
$$\mathbf{V = - C}$$

Therefore,

$$\mathbf{C' = 0}$$

This opposes to Einstein's Special Relativity, in which Einstein claimed that if he was running with a photon at light speed, he could still see the photon moving away from him at the light speed. It is totally impossible, unless he was running with the light source at a light speed away from the light origin [2].
Because,

$$\mathbf{C' = C + V}$$
$$\mathbf{V = 0}$$

Therefore,

$$\mathbf{C' = C}$$

IX. Light Speeds in Inertia System

Fig. 4 shows that a photon traveling in space, the same Vision of Light (red line) can be observed at different positions in an Inertia System (all positions are stationary to each others). Therefore, the light speeds observed in an inertia system should always be constant, no matter where the observers (reference points) are. However this constant speed can be different from the Absolute Light Speed (3×10^8 m/s) if it is observed in a different Inertia System other than that of the light source.

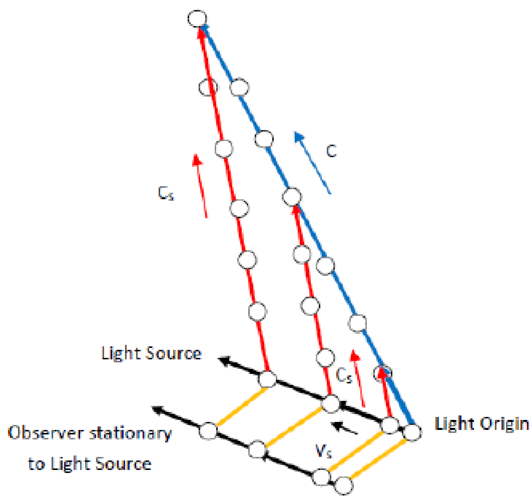

Fig. 4 Vision of Light (blue line) observed at light origin and the Vision of Light (red line) observed at the light source and those stationary to the light source.

In both Laser Gyroscope and Fiber Gyroscope, all lasers, mirrors, fibers and detectors are in the same Inertia System; therefore the light speeds are the same. However, the light traveling paths (visions of light) are different between forward and backward rotations, such that interference can be generated and the rotation angle of the gyroscope can be calculated.

X. Length Contraction

The length of an object is defined by the distance between the two end points (onsite real time positions) of the object. In compliance with Principle of Vision, the length of an object remains unchanged no matter the reference points (systems).

However, the length of an object observed (measured) either by an optical sensor or human eye can be different from that observed (coordinated) by the onsite real time coordination at a reference point (system). Both optical sensor and human eye can only detect and process the incoming photons at the "Same Time". In addition to the photon traveling time, a further time delay can be generated by human visual memory in the optical signal process.

Fig. 5 explains the "Same Time" detecting process of an optical sensor or human eye on a stationary object and a moving object respectively. In case of a stationary object, where Point M is the position of the optical sensor or human eye, Point A is the position of the closer end of the object and Point B is the position of the farther end of the object. P_A is the photon emitted from Point A and P_B is the photon emitted from Poin B. In addition, Δt is the photon traveling time from Point A and $\Delta t + \Delta t_1$ is the photon traveling tome from Point B. In result, photon P_A emitted from Point A at time $T - \Delta t$ and photon P_B emitted from Point B at time $T - (\Delta t + \Delta t_1)$ should meet together at Point M and received by the optical sensor or human eye at the "Same Time" T. With the information of the position of Point A brought up by photon P_A and the information of the position of Point B brought up by photon P_B, the optical sensor or human eye can thus process and determine the length of the object. Because all positions (Points A, B and M) are stationary to the reference point (system) – optical sensor or human eye, also the optical information of Point A and Point B are consistent, therefore the length of the object L observed (measured) by the optical sensor or human eye should be the same as that observed (coordinated) by the reference point (system).

In case of a moving object, with a similar set up as that of the stationary one, except the object is moving with the closer end from Point C to Point A and farther end Point B to Point D, the actual length observed by the optical sensor or human eye is different from that observed (coordinated) by the reference point (system). Because the closer end of the object has changed its position from Point C at time $T - (\Delta t + \Delta t_1)$ to Point A at time $T - \Delta t$ due to the time delay Δt_1 caused by the photon P_B traveling from the farther end Point B of the object at time $T - (\Delta t + \Delta t_1)$, therefore the length of the object observed by the optical sensor or human eye L at time T is different from the length L' (between Point C and Point B) observed (coordinated) by the reference point (system) at time $T - (\Delta t + \Delta t_1)$.

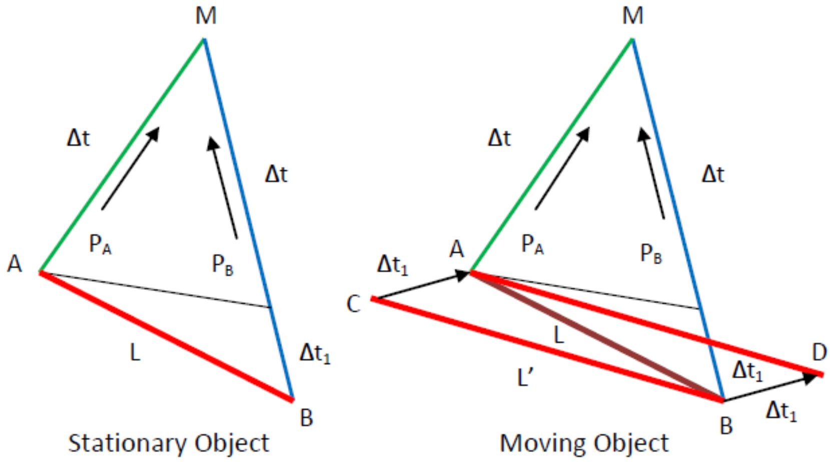

Fig. 5 The lengths of a stationary object and a moving object observed by optical sensor or human eye.

The length of an object measured by a human observer, along the direction of motion, is shorter than the length measured by another observer at rest with the object. This phenomenon is known as "Length Contraction" [4]. It is caused by human visual memory rather than the Velocity Time Dilation [5] that is derived from Einstein's Special Relativity [3] which actually never exists.

In the beginning, I am a little confused of the mechanism of Length Contraction. As a consequence, some mistakes were made in my previous publication [6]. A detailed analysis that human visual memory can affect Length Contraction is discussed as follows:

Fig. 6 shows the effect of length contraction caused by human visual memory. When a human observer travels along a linear object from one end Point A (the closer end of the object) at an angle α and speed V_1, due to human visual memory (1/30 seconds), observer can see simultaneously at a location within a distance $V_1/30$ from Point A, the photon from adjacent Point A and the photon from far distance Point B, both having Absolute Light Speed C from the light sources (Point A and Point B) stationary to the reference point on the object. Therefore, a length of the object equals to Ct_1 which is smaller than the length L measured on ground can be observed.

As a result, for the same angle (α), traveler with higher speed ($V_1 > V_2$) can find larger length contraction and smaller length of object ($Ct_1 < Ct_2$). Even more, for the same speed (V_2), traveler with smaller angle ($\beta < \alpha$) can also find larger length contraction and smaller length of object ($Ct_3 < Ct_2$). However, for a very low speed ($V \to 0$), the length of the object observed by the traveler is about the same as that observed on ground ($Ct = L$). Furthermore, for any V/30 and Ct combination outside the Ct = L circle in pink area (Fig. 6), the length of the object observed by the traveler is bigger than the length L observed on ground. In other words, Length Expansion can also be found by the observer traveling along the direction with larger angle and speed away from the object.

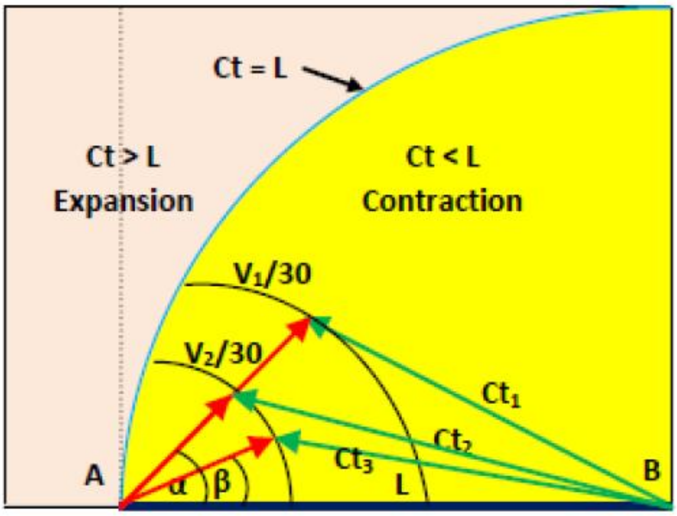

Fig. 6 Length contraction caused by human visual memory.

XI. Conclusion

Length Contraction is interpreted by human visual memory instead of Einstein's special relativity. The mechanism of an interactive observation by optical sensor or human eyes is studied. The concept "Same Time" in observation process is explained. As a result, in compliance with human visual memory, length contraction along the object can be recognized with different traveling speeds and angles. In addition, length expansion can also be observed along the direction away from the object.

[Reference]

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