The laws of mechanics and gravity depend on the motion of the physical systems, and not on the motion of reference frames; only real (absolute) motions have a cause

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Abstract

Galilean (and Einstein's) invariance principle gives significance to the relative motion of reference frames (observers). And it states that the laws of physics do not vary in reference frames that are in relative uniform-rectilinear motion and vary if the reference frames are accelerated. Therefore all inertial frames are in uniform-rectilinear motion relative to each other. This paper presents a new principle that gives significance to the relative motion of physical systems (e. g the solar system) and not to reference frames. It shifts the focus from the motion of reference frames (observers) to the motion of the physical systems to be observed. It states that the laws of mechanics and gravity (in their simplest or complex forms) are the same in physical systems that are at rest relative to each other and vary if there is relative motion between the two systems. This implies the validity of absolute reference frames in which the laws of mechanics are in their simplest forms. The laws of mechanics (and gravity) are independent of the choice or relative motion of reference frames. Therefore, we can use any reference frame provided that we know its motion relative to the physical system or relative to an absolute reference, with the same result for all reference frames; however, we can use reference frames attached to the physical systems for convenience (for example to the centre of the sun for the solar system). An observer should not attempt to apply the laws of mechanics before knowing his /her state of motion relative to an absolute reference or relative to the physical system to be observed. The relative motion of physical systems has kinetics effect, whereas the relative motion of reference frames (observers) has only kinematics effect. Inertial frames may be redefined as: All inertial frames are at rest relative to each other. Thus a frame which is in motion relative to an inertial (absolute) frame is not an inertial frame. All real motion has a cause and hence we can differentiate between real and illusionary motions. Motion without a cause is not a real motion. This is obviously an opposing view to relativity.

A thought experiment with two identical solar systems and two observers is presented to show that the laws of mechanics and gravity are not the same in physical systems that are in relative motion.

Introduction

Galileo's (Einstein's) invariance principle states that the laws of mechanics and gravity are the same in reference frames that are in uniform and rectilinear motion relative to each other.

The currently accepted (assumed) definition of inertial frames is [1]:

All inertial frames are in a state of constant, rectilinear motion with respect to one another; they are not accelerating in the sense that an accelerometer at rest in one would detect zero acceleration. In an inertial reference frame, the laws of mechanics take their simplest form.

Physical laws take the same form in all inertial frames. By contrast, in a non-inertial reference frame the laws of physics vary depending on the acceleration of that frame with respect to an inertial frame, and the usual physical forces must be supplemented by fictitious forces.

In this paper a new principle has been proposed which states that the laws of mechanics are the same only in physical systems that are at rest relative to each other and this leads to the validity of absolute reference frames in which the simplest laws of mechanics are defined and applied. A thought experiment using two identical hypothetical solar systems and two observers has been presented to demonstrate the variance of the laws of mechanics and gravity in physical systems that are in relative motion. The assumption of gravity as a fictitious force is based on General Relativity theory, which this paper argues against.

Discussions

Galileo's (Einstein's) invariance principle states that the laws of mechanics are the same in all *reference frames* that are in uniform- rectilinear motion relative to each other. This paper presents a new principle: the laws of mechanics are the same only in physical *systems* that are at rest relative to each other and are independent of the motion of reference frames.

There are three differences of the new principle from Galilean principle. According to the new principle:

1. Relative motion of reference frames has no fundamental significance, whether uniform-rectilinear or accelerated motion , on the laws of mechanics. The relative motion of reference frames has only kinematics effect and no kinetics effect.
2. It is the relative motion of physical systems that has fundamental significance or kinetics effect.
3. Galileo's invariance principle is concerned with the *relative motion of reference frames* where as the new theory is concerned with the *relative motion of physical systems*.

The new principle leads to the validity of absolute reference as follows.

1. If the laws of mechanics are the same only in physical systems that are at rest relative to each other (and not the same in physical systems that are in relative motion),
2. And as there is a ***single*** set of simple laws of mechanics
3. Therefore, there is a ***single*** set of reference frames that are at rest relative to each other in which the laws of mechanics are observed in their simplest forms. We call these absolute reference frames.

In other words, if one accepts the variation of the laws of mechanics in physical systems that are in relative motion (and the invariance of laws of physics in reference frames that are at rest relative to each other), then they will also accept the validity of an absolute reference.
The relative motion of reference frames, whether uniform-rectilinear or accelerated motion, has no fundamental role.
The argument on the variation of the laws of mechanics and gravity for physical systems that are in relative motion is presented in the next section.

The laws of mechanics and gravity are not the same in identical hypothetical solar systems that are in motion relative to each other (a reference frame in motion relative to an inertial frame is not an inertial frame).

Let us perform a thought experiment with two identical solar systems (A and B) in space and two observers, with one observer in each solar system. Suppose that the two solar systems are initially at rest relative to each other. As the two solar systems are identical and at rest relative to each other, the two observers should observe the same laws of physics. Let us assume that both observers observe circular planetary orbits (simplest laws of physics). Suppose now that one of the solar systems (solar system B) starts accelerating relative to solar system A, by the application of some external force on solar system B, and finally settles on some speed relative to solar system A . But can solar system A equally claim that it is the one that is in motion, according to Einstein's relativity? No, because all motion has fundamentally a cause. And the motion of solar system B is caused (has a cause, which is some applied force on it), where as the 'motion' of solar system A has no cause. This means that the motion of solar system A is only an illusion and not real.

When the two solar systems were at rest, they both had circular planetary orbits around their respective suns, as shown in Fig.1.
As solar system B starts accelerating relative to solar system A, the planet in solar system B will be pulled along by its sun. However, it will not respond instantaneously and will be left behind. If the whole process is analysed, the orbit on the right hand side of the sun can be shown to increase in size, where as the orbit on the left side of the sun will decrease, resulting in a non circular orbit (neither circular nor elliptic) as shown in Fig. 2. The orbit shown in Fig.2 is the final steady state orbit after the acceleration of the sun has ceased. The final shape of the orbit can also be explained as follows. The total velocity of the planet on

the right hand side will be greater than its total velocity on the left side of the sun. On the right hand side of the sun (as seen in the direction motion of the sun), the total velocity of the planet (as seen from the observer in solar system A) will be equal to the sum of the translational velocity (V_{tran}) of solar system B and the tangential velocity (V_{tan}) of the planet due to its rotation around the sun. Hence, the centrifugal force will be greater resulting in bigger radius of the orbit. On the left side, the total velocity of the planet will be the difference (V_{tran}- V_{tan}) and hence less centrifugal force and less orbital radius. A more detailed discussion can be found on my other paper [2][3].

Fig.1

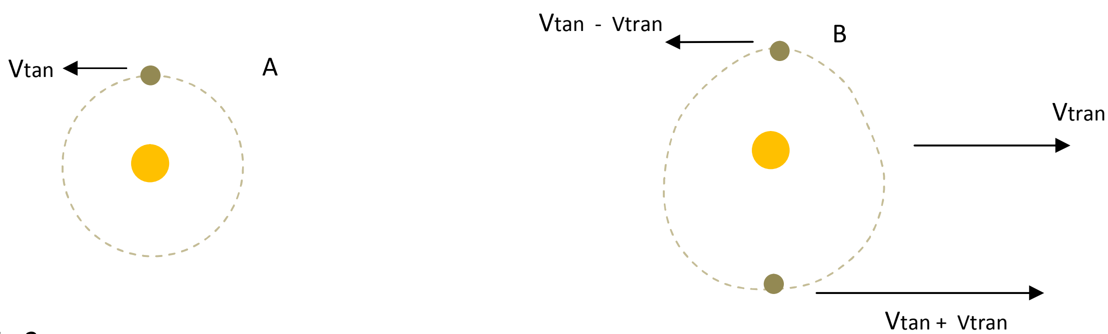

Fig.2

Thus it has been shown that the laws of mechanics are not the same even in physical systems that are in uniform and rectilinear relative motion (and also accelerated motion) with respect to each other (note that solar system B has finally settled on a constant velocity relative to solar system A, after the acceleration has ceased. Hence, the two solar systems are in uniform-rectilinear motion relative to each other). This may also be explained by the fact that there will always be acceleration to go from one velocity level to another velocity and we know that acceleration will always alter the laws of mechanics. The laws of mechanics in the accelerating system will undergo changes during the time of acceleration and will settle in a new form once the acceleration ceases and the laws will not return back to their initial form that existed before the beginning of the acceleration. Thus the laws of mechanics and gravity will be observed differently for each value of relative velocity.

Therefore, it follows that a reference frame in motion relative to an inertial frame will not be an inertial frame (the orbit in solar system A is circular, where as the orbit in solar system B is non-circular, even though their relative motion is uniform-rectilinear). Therefore, a reference frame can be an inertial frame only if it is at rest relative to an inertial frame.

Galilean (and Einstein's) invariance principle that states the laws of mechanics are the same for reference frames in relative uniform-rectilinear motion has also been shown to be incorrect. Of course, the laws of mechanics are independent of the *relative motion of reference frames* but depend on the *relative motion of physical systems*.

All real motion is absolute and has a cause – motion without a cause is not real (or absolute) motion

According to Einstein's relativity theory, all motion is relative and two relatively moving observers or systems can equally claim to be the one in motion. But this notion is against a fundamental law of nature or truth that all ***real*** motion has a cause. Therefore, we can differentiate between real motion and illusionary motion. To know which of two relatively moving objects or observers is really moving or to know how much part of the total relative motion each one takes, we should study the history of the motions. As we go back in time (assume that all history is recorded), we can discover the different factors (forces) that caused each moment of acceleration.

Suppose that you see a space ship and a planet in space moving relative to each other. According to relativity theory both the planet and the space ship can claim to be the one in motion. But assume that after studying the history of the motions, it was finally discovered that the space ship was launched from the planet many thousand years ago. Therefore, both had some common velocity before the launching of the space ship. During the moment of launching the space ship, according to Newton's law of action and reaction, equal and opposite forces acted both on the spaceship and the planet. However, due to the huge size of the mass of the planet relative to the mass of the spaceship, say, more than 99.9999% part of their relative velocity will be the velocity of the space ship and only 0.0001% part of the relative velocity was taken by the planet.

Therefore, if two objects have relative velocity, each object will take its portion of the total relative velocity. If two objects have a relative motion of, say 100 m/s, then 70 m/s may be the velocity of one object and 30 m/s the velocity of the other object. This is different from the Relativity's notion that both objects can claim to be the one in motion. Thus all motion is fundamentally absolute.

If we continued the study of the motions, we would discover the cause of the motion of our hypothetical planet and of all other cosmic bodies and would be able to assign to each cosmic body its own part of each relative velocity it has with other heavenly bodies. If we knew the history of the universe we would know the history of all motion we see in the universe today and hence would identify real motions (caused motions).

If there is a relative velocity between two objects then it has a cause, directly or indirectly. There is no relative or absolute velocity which has no ultimate cause.

In the two hypothetical solar systems example presented previously, solar system B is the one in motion because it is a caused motion. However, the shape of the two orbits will definitely be different as far as there is relative motion even if an agreement on which planet is accelerating or moving is not reached and this disproves Galilean invariance principle and hence Einstein’s relativity theory as the whole theory of relativity is based on the validity of Galileo’s invariance principle.

Conclusion

The whole formulation of Einstein’s relativity theory started from and is based on Galilean invariance principle, which has been shown to be incorrect in this paper. Therefore, the first postulate of relativity is incorrect. The absolute constancy of the speed of light is also shown to be incorrect in my other papers [4] [5].

References

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