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PREINERTIA AND ROTATIONAL MOTION

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Abstract.-The vast majority of objects in the observable universe are subject to rotational motions around an internal axis of rotation and to one or more rotational motions around external centers (or loci) of rotation. After recalling the absolute nature of all these rotations, this article demonstrates that all the rotational motions of any body A are inherited by any other body B set in motion from A . Consequently, and taking into account that the term preinertia suggests the sole inheritance of inertial motions (rectilinear and constant velocity), it is also proposed here to change the terms preinertia and preinertial respectively to the more general prekinesis and prekinetic.

Keywords: preinertia, uniform motion, rotational motion, absolute motion, prekinesis, prekinetic, Principle of Inertia.

1. Introduction

The Galilean concept of preinertia has been recalled and developed by the author of this article in several of his publications. Although it is true that Galileo did not use the term preinertia or develop it, he is the first author, to my knowledge, to write about this universal property of all physical bodies [1, p. 228]:

SAGREDO. If it is true that the impetus with which the ship moves *remains imprinted on the stone after it has separated from the mast*, and if it is also true that this motion does not hinder or slow down the straight downward motion natural to the stone, *it is bound to follow a marvelous effect in Nature*

That *wonderful effect of Nature* is preinertia, a property of all physical objects that can be provisionally defined in this introduction as the ability of every physical object, including photons, to inherit the VELOCITY VECTOR of the reference frame (another physical object) from which it is set in motion.

No author since Galileo, not even Newton, has echoed this universal mechanical property of all physical objects. One might think it obvious and irrelevant. It could be that it is obvious given the overwhelming empirical evidence of its physical reality: every time an object falls just below the place from which it was dropped. But it is anything but irrelevant.

In fact, it is very easy to demonstrate that preinertia makes it impossible to detect absolute motion, if this type of motion -rejected by contemporary physics- were to exist. It also opens a new way to demonstrate that all motions are absolute. Consequently, preinertia is a universal and highly relevant property of all physical objects. It is a property ignored by contemporary physicists, and one to which contemporary physicists should pay some attention.

The term preinertia brings to mind inertia and inertial motions: constant speeds in straight trajectories. But in reality, this is not the case: rotational motions are also inherited. This is demonstrated in this article. And this makes it advisable to change the terms preinertia and preinertial to prekinesis and prekinetic, respectively, which are more general and less ambiguous. In addition to being reasonable, the proposal to change those two terms makes sense because the terms preinertia and preinertial are still not widely used.

The second section of the article demonstrates the absolute nature of rotational motions, both internal (around an internal axis of rotation) and external (around external rotation centers). It forms part of several articles already published by the author, and it is necessary to include it here to justify the definition of preinertia (prekinesis) given in the third section of this article.

Since the concept of preinertia is not yet widely known (will it ever be?), the article briefly recalls it in its third section, referring the reader to some of the publications where more details can be found. That third section is followed by a fourth section demonstrating the inheritable nature of rotations, which is the main subject of this article. The change in

terminology mentioned above is then proposed. The article ends with two very brief sections: the fifth section recalls Foucault's pendulum in relation to precession, and the sixth recalls Galileo Galilei, the true discoverer of precession and one of the great founders of modern physics.

2. Absolute rotations

(With some modifications, the content of this section has already been published in other works by the author, for example [8])

Virtually all objects in the observable universe are subject to complex motions that can be broken down into simpler ones, most of which are rotations around an internal axis of rotation or external center of rotation. This is the case, among many others, for the sun and all the planets in the solar system. From each of these planets it is the Sun that seems to rotate around each of them. But obviously this is impossible: the Sun cannot rotate at the same time around different centers of rotation (the center of each of the planets). The rotation of the Sun around each planet is an apparent rotation, but as such appearance, the appearance is real, observable and measurable. From this, we can deduce the reality of each of these rotations of all the planets in the solar system. To deduce the absolute nature of these rotations, we must consider some of the parts of the object subjected to this rotation. We will analyze the rotations of the Earth, although billions of other cosmic objects could serve.

In the case of the Earth, the first rotation to be considered is its rotation around an internal axis (the Earth's rotation axis), and only its rotation around the internal axis of the Earth daily rotation. It is a real rotation because it produces observable and measurable effects: the apparent daily rotation of the Sun and the rest of the cosmic objects around the Earth. In each rotation of the Earth around its internal axis of rotation, *each of its points describes a unique circle, with a unique center of rotation that will be a unique point on the Earth's unique axis of rotation*. And since a point cannot be in two different places at the same time (as would be the case if it rotated around two or more different centers of daily rotation), the motion of rotation of each of the points of the Earth around a unique point of its unique internal axis of rotation is unique; and can only be referred to that unique point of the unique internal Earth's axis of rotation, which will therefore be an absolute axis of absolute rotation. The rotation of the Earth around its internal axis of rotation is, therefore, a real and absolute motion. Although, as we shall see, that absolute internal axis of absolute rotation is in turn rotating around other centers of absolute rotation external to the planet.

Instead of considering the points of the Earth, let us now consider the Earth as a whole, the Earth as a planet. The planet Earth, as a whole, now rotates in an elliptical orbit around the Sun (which occupies one of the foci of the ellipse). That (so-called) translational motion of the Earth around the Sun also produces apparent motions in the rest of the cosmic objects. And although they are apparent, not real, appearances as such appearances are real: they are observable and measurable. And for the same reason as in the case of the points in the rotation of the Earth around its absolute internal axis of absolute rotation, the elliptical orbit of the Earth is also unique (although it is not stable and in time may oscillate with respect to certain equilibrium positions). So, also in this case, the rotation of the Earth around the Sun is a real and unique motion that can only be referred to the absolute geometrical elements of its unique absolute elliptical orbit. It is therefore a real and absolute motion.

Let us consider again the points of the planet Earth subjected to both motions, real and absolute, of rotation around two unique and absolute geometrical elements: the absolute axis of the Earth's internal rotation and the foci of the absolute orbital ellipse of the Earth's rotation around the Sun. The compound motion of these two real and absolute rotations will no longer be a rotation but a helical motion, also real and absolute but more complex, with two components: the absolute rotation of each point of the Earth around its absolute internal axis of rotation, and the absolute rotation of the Earth (and therefore of each of its points), around the absolute foci of the described ellipse around the Sun. And each of these motions being real and absolute, its helical composition must also be a real and absolute motion of each of the points of our planet, a motion referred exclusively to unique and absolute geometrical elements: the absolute axis of internal rotation of the Earth, and the absolute foci of the absolute ellipse that follows the Earth around the Sun.

But the kinetic history of the real and absolute rotations of the Earth and its points does

not end here, although the logic followed by the new motions that will have to be considered is exactly the same above impeccable logic. Now we will have to consider the joint rotation of the solar system as a whole around the "center" of our galaxy, the Milky Way. Then the rotation of the Milky Way around the center of its Local Group of galaxies. Then the rotation of the Local Group around the Virgo (or Local) Cluster of galaxies. And then the rotation of the Virgo Cluster around the Virgo Supercluster. All of them real and absolute rotations, which can only be referred to real, absolute and unique centers of rotation, exactly for the same reasons as the first two rotations analyzed. At least 6 real and absolute rotations compose the motion of each of the points of our planet, and of each of the planets of the solar system. Therefore, this compound motion can only be real and absolute. Other motions of the Earth and its orbit (precession, nutation, Chandler's wobble, perihelion precession) have been omitted because they do not affect the conclusions to be drawn about the existence of absolute motions in the universe.

The above arguments about simple and compound rotations allow us to draw the following conclusions:

Conclusion 1 *In the observable universe, there are objects with absolute rotation motion around a single internal rotation axis.*

Conclusion 2 *In the observable universe there are objects with absolute helical motions compound of absolute rotations each around an exclusive internal axis of rotation, and one or more exclusive centers of rotation.*

Conclusion 3 *In the observable universe there are absolute rotations and absolute motions composed of two or more absolute rotations.*

Conclusion 4 *Absolute motion exists in the observable universe.*

According to everything we know about the observable universe, the vast majority of the trillions upon trillions of cosmic objects move in accordance with the above conclusions. Therefore, the vast majority of cosmic objects in the observable universe move in absolute, not relative, terms. Although different absolute motions give rise to different relative motions, the only really and directly observable ones, due just to preinertia [5, [pdf](#)].

3. Preinertia

The sole purpose of this section is to recall the concept of preinertia, first published among others in [3, 6, 7, 8]:

Definition 1 (of Preinertia) *Preinertia is the universal physical property of all physical objects whereby each object inherits the absolute velocity vector of the body from which it is set in motion.*

It is important to highlight the vectorial nature of the kinetic inheritance of preinertia because even photons are preinertial [3], although in this case they only inherit the direction and sense of the velocity vector of the body from which they are created and emitted. The empirical evidence for preinertia is overwhelming: for example, as indicated above, whenever an object *B* mechanically anchored to another object *A* (e.g., the Earth or any vehicle moving on the Earth) is dropped onto object *A*, it falls vertically from the point from which it is dropped.

It therefore makes sense to include this universal property of all physical objects in Newton's Principle of Inertia, using the new terminology that will be justified in the following section:

Principle 1 (of Inertia) *Every physical object is prekinetic and remains at rest or in uniform motion as long as no external force acts upon it.*

4. Inheritance of rotational motions

Until now, all of the author's published works on preinertia referred to the inheritance of the absolute velocity vector of the body from which other objects are set in motion, without specifying that these motions include inertial motions and rotations. From now on, and based

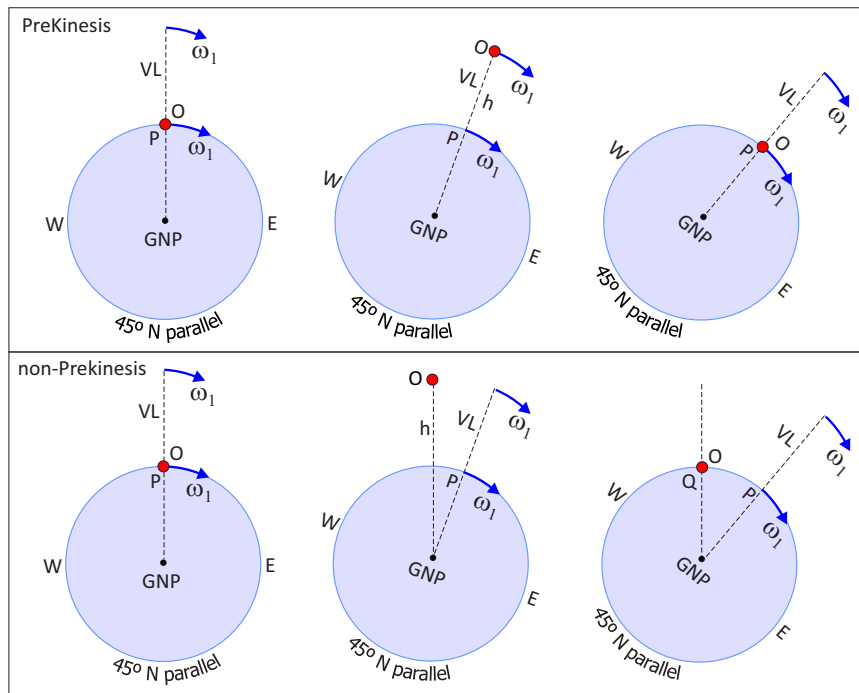


Figure 1 – Top: Inheritance of the Earth's rotational motion around its internal axis of rotation, viewed from the vertical of its geographic North Pole GNP. P vertical launch point of any physical object O ; VL : vertical line on the Earth through point P ; ω speed of rotation of the Earth around its internal axis of rotation; h height (greatly exaggerated) reached by object O ; W : West; E : East. Bottom: the same experiment considering that the Earth's daily rotation is not inherited by O when set in motion.

on the argument that follows, it will include them. Also from now on, the terms preinertia and preinertial will be replaced by prekinesis and prekinetic, respectively.

The vast majority of objects in the universe are subject to one or more rotational motions around internal axes of rotation and external points of rotation. In the following argument, it is worth considering any of these motions of any of these objects. We will do so with the rotational motion of the Earth around its internal axis of rotation, which, as is well known, is approximately one complete rotation every 24 hours. Suppose that from any point P on the surface of the 45° N parallel of the Earth, an object O is thrown vertically, rising to a height h and then falling back to the Earth's surface, taking a total time of 1 second.

It is easy to calculate that in one second, the Earth rotates at an angle of approximately 0.004166667, equal to approximately $7.272263394 \times 10^{-5}$ radians. Considering that the radius of the 45° N parallel is approximately 4490 km, during one second (the time it takes for object O to complete its motion), the point P has moved 326.52 m eastward. Therefore, if object O did not inherit and maintain the Earth's rotational speed throughout its motion, it would fall 326.52 m westward, which is obviously not the case (Figure 1). The same argument applies to all objects that are anchored to the Earth and that we drop, or that fall naturally, from any height to the Earth's surface. This rotational motion's inheritance also applies, as the reader can verify, to all objects thrown upward at any angle.

On the other hand, if an object set in motion from Earth with a velocity \vec{v} relative to Earth did not inherit any of the single rotations ω_i of Earth, that object would move relative to Earth with that velocity \vec{v} plus the opposite of the uninherited rotation velocity ω_i , which has never been the case in the trillions of objects put into motion from Earth.

The Principle of Directional Evolution of the universe states that the universe evolves independently of its observers and always in the same direction of increasing its total entropy [3, p. 442] [4, p.71]. If this principle is correct, then so is the consistent nature of the universe. Consistency that could also be assumed as a fundamental principle, considering, as indicated above, the enormous number of objects of the same type and of different ages that exist in the universe, which is only possible if the same set of consistent laws have been directing the evolution of the universe throughout its history. Well, according to this universal consis-

tency, the same thing that happens on Earth under the same circumstances also happens in the rest of the bodies in the observable universe. Therefore, we can conclude that all the rotational motions of a physical object A are inherited by all physical objects B set in motion from A . It is reasonable, therefore, to propose the following:

Definition 2 (of Prekinesis) *Prekinesis is the capacity of a physical object to inherit the absolute velocity vector of the physical body from which it is set into motion. Objects with this property are called prekinetic objects.*

And then assume the following:

subTheorem 1 (of Prekinesis) *All physical objects in the universe are prekinetic.*

Where a sub-theorem is an statement based on both logic inferences and empirical data.

5. Prekinesis and Foucault's pendulum

Although a pendulum is not an object that is mechanically separated from the Earth when set in motion, Its mechanical connection to the Earth is made through the end of a thin wire, so that when it is set in motion, if the thread is long enough and the pendulum ball has sufficient mass, the pendulum will vibrate for several hours and its inertia will overcome the prekinesis, so that it will not rotate with the Earth in its daily motion of rotation. However, it will rotate with other rotations of much higher speeds, such as the rest of the Earth's rotations around the Sun, the solar system, the Milky Way, etc.

6. Galileo Galilei

The physical importance of prekinesis has already been highlighted by the author [8, 2]: on the one hand, it makes it impossible to detect absolute motion, and on the other, it makes it possible to formally demonstrate that all motions are in fact absolute motions, even though only relative motions are detectable and measurable. It seems appropriate to conclude this work by remembering the true discoverer of prekinesis: Galileo Galilei in 1632 [1, p. 228]. Although recognized as one of the founders of modern science, his idea of prekinesis has not been considered, as far as I know, by any subsequent physicist. I have the impression that, if it had been taken into account, the history of physics would have been very different from what it actually has been.

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