Somsikov A.I.

Law of inertia

Misconception of the First Law of Motion, so called the Newton's First Law or the Galileo's Law of Inertia, is revealed.

The Galileo's Law of Inertia, also called the Newton's First Law, is applied as follows: "If there is no force, the body motion is uniform and rectilinear, not limited in time and space."

Since this unlimitedness is practically impossible to verify, Galileo's proposed proof of this is purely logical.

The experiment is an observation of the body moving along the inclined plane with positive and negative angles of inclination corresponding to the body rolling down or rolling up.

Observation detects the accelerations of opposite signs.

It follows that the zero angle of inclination must correspond to zero acceleration, i.e., a uniform motion not limited in time and space (in other words, it is *eternal* and *infinite*).

This *logical* induction looks flawless even considering that the real movements are limited.

It just considers having a slight negative acceleration caused by the postulated friction resistance of the body with the reference plane due to their touching.

Since scientific research is akin to a criminal investigation, detectives call it a false trail intended to distract attention. Minor observation, only simulating its extreme thoroughness, taking the attention of the observer from a large logical error. And what is truly surprising is the ease with which this bait is taken, which carries everyone away.

Indeed, it is assumed that acceleration would be really zero in the absence of any contact with the bodies creating this friction.

But is such a conclusion possible?

First, the experiment does not meet the initial requirement – lack of force. It has this force, although it is compensated by the counterforce from the flat surface. But this means that the elimination of contact with bodies also eliminates the contralateral force as a required condition of force compensation, and hence the required condition of the assumed zero acceleration.

But even in the ideal case, when the touching of bodies (necessary to create a counterbalancing contralateral force) is preserved and there is no resistance to friction (i.e., under conditions of thought experiment), is this logical conclusion correct? Is acceleration equal to zero?

The movement under observation is directed perpendicular to the acting forces.

The contralateral force of the flat surface is always perpendicular to it and movement, and what about the compensated initial force?

Under condition of eternal and *infinite* motion?

The matter in question is the gravity of Earth.

It is also *centered* in the direction of active acceleration, i.e. at the starting point of the inertial reference frame (IFR), combined with the center of mass, or the center of the Earth in this case.

The acceleration caused by gravity must be perpendicular to the reference plane.

This condition is met in the initial position.

But under condition of eternal and infinite motion the acceleration acquires an angular rotation towards the IFR starting point, so that its projection to the motion direction in general has a non-zero value.

This projection has a *braking* effect on the motion without friction.

This violates the requirement of no force in the motion direction or perpendicular to this direction.

Consequently, the assumed infinity in time and space of uniform linear motion is *impossible*.

Galileo's experiment is performed only on a limited scale, and its postulated infinity is an *inadmissible* extrapolation.

It also follows that the motion uniformity is conditioned by keeping continuous orientation perpendicular to acceleration.

This preservation is possible in case of the *circular* motion of body with a radius of curvature that keeps the value constant relative to the IFR starting point only.

Therefore, the true logical induction that follows directly from Galileo's experiment is: "If there is a *centered* force compensated by the oppositely directed force, the body motion is a *uniform rotation* relative to the IFR starting point, not limited in time and space."

This is exactly what can be seen in countless examples of such rotations, from the Moon and other space objects to the microcosm represented under atomic scale, when removing the contact with the surface replaced by the centrifugal force.

But what about the real, *true* absence of force? Let’s modernize Galileo's experiment, even if just in our thoughts.

To do this, the motion perpendicular to the gravitational force must be at such a distance from the IFR starting point that this force could be simply ignored.

This can always be achieved by selecting the appropriate scale.

Such movement can indeed remain uniform and straightforward on an unlimited scale of space and time in the IFR *under observation*.

Is this IFR itself spatially immobile?

No, it moves too, and moves *with acceleration*, but in *another* IFR (for example, the solar system).

Consequently, the motion under observation, which is uniform in the initial IFR, is accelerated in another IFR.

We can continue the thought experiment, removing this motion even further, so far from the solar system, where its motion in this IFR will already be uniform.

But this, first, will not be the initial Galileo's (Earth) IFR, where it will still be accelerated.

And, secondly, the solar system itself is moving rapidly relative to the Galactic Center, which forms the third IFR.

It is possible to continue increasing the cosmic scale of Galileo's uniform and rectilinear motion, taking it out of the Galaxy.

But even this does not mean that the motion will remain uniform in the previously left earthly and solar IFR.

Moreover, the Galaxy itself may move rapidly in the system of other galaxies relative to the other center formed by their nearest or distant environment.

As a result, it turns out that the Galileo's Law of Inertia or the Newton's First Law (and the First Law of Motion) is not implemented not only on a limited scale, but also in an unlimited scale, and just nowhere and never, due to the *centering* of gravity, so that its logical justification is completely *wrong*.

Surprisingly, this mistake has gone unnoticed so far.

This is a common feature of the old sciences: reasoning, which would have been immediately disproved now, quietly exists, not noticed after a certain time, when the researchers do not even think to subject it to a repeated logical examination.

Perhaps it takes a special independence of thought to embark on an old journey without any thought of its guaranteed results, for the only love for scientific truth.

Meanwhile, they started to think independently (not at once impeccably and not even too confidently, of course) so recently – just three hundred years ago!

They started to think for themselves just a short while ago, just three hundred years ago!

So, the very possibility of some inaccuracies and even mistakes for those who have experience of independent reasoning is very possible and even almost inevitable.

It would be unbelievable not to detect them at all with some thorough analysis.

Meanwhile, they are searching with Einstein (without results) while we should start with Newton or Copernicus.

Einstein is, of course, a crisis, but it is very late, laid much earlier by his pioneer predecessors.