

**LECTURES ON A NEW DYNAMICS**  
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**THE FIRST LECTURE**

**1. Common data on dynamics**

**Dynamics - section of theoretical mechanics in which the connection between motion of material points and bodies is established and studied, including the forces working on them.**

The basic models of real objects in dynamics are a material point and an absolutely elastic body. Material points within real objects, where distinctive motion of separate points are very small, allow them to be neglected. If the separate points of the object are impossible to neglect, its motion is considered the motion of a firm body. An absolutely firm body is a set of material points where distances between them do not vary.

A set of material bodies which cannot move independently due to connections between them, is referred to as a mechanical system. An automobile, a tractor, a combine, are typical examples of mechanical systems.

The laws of dynamics are based on the fundamental axioms of the natural sciences: space and time are absolute. Space, matter and time are not separated. The reliability of the axioms follows from the evidence of their statements. The reliability of the laws of dynamics, which are based on axioms, is not obvious and is proven by experiment. Therefore, the laws of dynamics cannot be counted as axioms. They are postulates.

The laws of dynamics were systematized for the first time by Newton in the book "**The Mathematical Beginnings of Natural Philosophy**" (1687).

**2. Laws of Dynamics**

**The First LAW**, was formulated by Newton as follows: «**Any body remains in a condition of rest or uniform and rectilinear motion, where there are no forces to change this condition**» (fig. 1, a, position 1). We identify an uncertainty of physical sense in this definition. What forces are being discussed? Since the answer to this question is not given, we shall commence with the formulation of Newton's second law.

**The Second LAW (basic)** is established as Newton's force  $\vec{F}$  driving a body, and is equal to the product of its mass  $m$  and acceleration  $\vec{a}$  and coincides with the direction of acceleration (fig. 1, a, a position 2).

$$\vec{F} = m\vec{a}. \quad (1)$$

We must consider a more exact description of Newton's second law. The concepts "driving" and "force" are identified as meaning that the acceleration  $\bar{a}$  of a moving body is the result of the driving force determined under Newton's second law,  $\bar{F} = m \cdot \bar{a}$ . All other forces are the resistance to motion.

In 1743, D'Alembert added this law, having specified that during each given moment of time for an accelerated moving body, the force of inertia  $\bar{F}_i$  is directed opposite to the direction of acceleration  $\bar{a}$  (fig. 1, a, a position 2). From this followed that force of inertia is directed opposite to Newton's force,  $m\bar{a}$ .

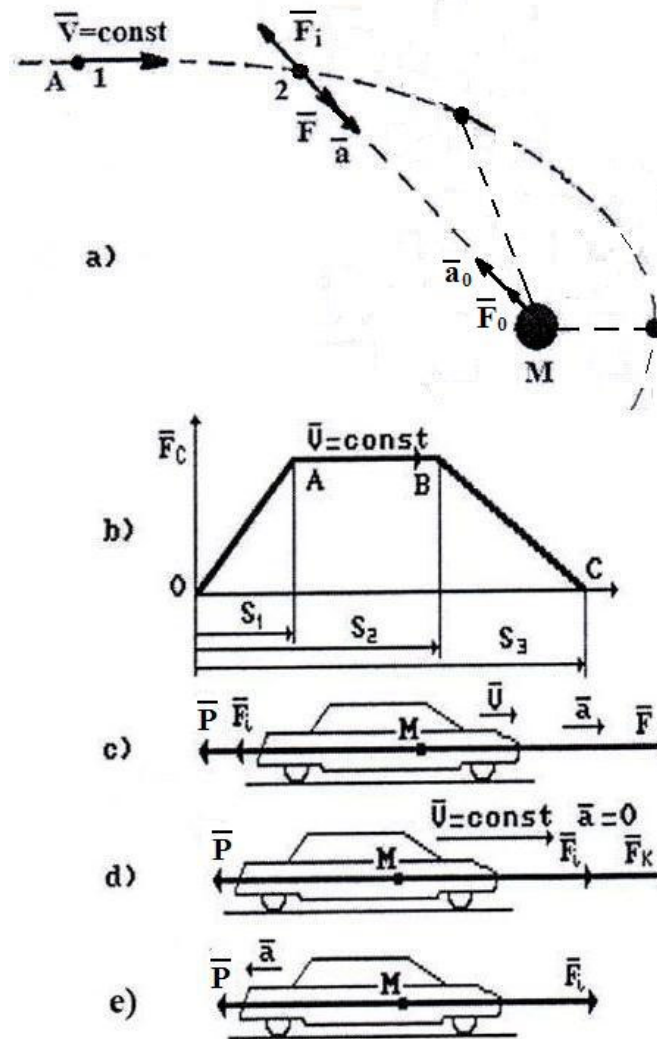


Fig. 1. a) – Circuits of rectilinear uniform and curvilinear motion of an asteroid; b) the circuit accelerated OA, uniform AB and the decelerated BC motion of an automobile; c) – the circuit of forces working on the automobile with accelerated OA motion; d) – the circuit of the forces working on the automobile at uniform AB motion; e) – the circuit of the forces working on the automobile at decelerated BC motion.

Certainly, there was the question: how is there a force of inertia working with other forces on an accelerated moving body? The search for the answer to this question was denied by the erroneous formulation of Newton's first law as from it followed that there was a cancellation of Newton's force,  $\bar{F} = m \cdot \bar{a}$ , acceleration  $\bar{a} = 0$ , so the force of inertia  $\bar{F}_i$  directed opposite to

acceleration, disappeared. Another question remains unanswered: what force impelled asteroid A (fig. 1, a, a position 1) with a speed  $\bar{V} = const$ ? But this was ignored and science continued to develop theories and solve tasks using the common equation

$$m\bar{a} = \sum_{i=1}^n \bar{P}_i, \quad (2)$$

where  $\sum_{i=1}^n \bar{P}_i$  = the sum of all forces of resistance working on an accelerated or decelerated moving body. For more than 300 years it was considered that Newton's force  $m\bar{a}$  moved the body, and the sum of forces  $\sum_{i=1}^n \bar{P}_i$  interfered with this movement without the participation of the force of inertia,  $\bar{F}_i$ . To be convinced of an inaccuracy of such an approach to the resolution of the problems of dynamics, we shall consider in detail an accelerated motion of an automobile (fig. 1, b). Each of us knows, that accelerated motion causes the force of inertia to press us into the back of the seat. If another automobile strikes our automobile from behind, the acceleration can be so large, that the force of muscles of our body and durability of a cervical backbone appear much less than the forces of inertia, which will force our head backwards. The headrest restricts excessive backlash. If the automobile collides with an obstacle, the acceleration will reverse and the force of inertia appears directed against the motion of the automobile. Safety belts prevent us from being thrown against the windshield.

So the reliability of the described process in the change of direction of the force of inertia is proved by millions of lives of passengers in automobiles, although physics and mechanics theorists continue to ignore it, considering, that force of inertia  $\bar{F}_i$  is not included in number of forces  $\sum_{i=1}^n \bar{P}_i$  working on a body in acceleration or deceleration. We wish to correct this mistake.

At the accelerated motion of the automobile (fig. 1, c), Newton's force  $\bar{F}$  is in operation as generated by its engine. The force of inertia  $\bar{F}_i$  is directed opposite to the acceleration  $\bar{a}$  of the automobile and consequently, brakes its motion. The total force of all external resistance is  $\sum_{i=1}^n \bar{P}_i$  which is also directed opposite to the motion of the automobile. As the result, we have the conclusive equation of the forces working on an accelerated automobile (fig. 1, c)

$$\bar{F} = \bar{F}_i + \sum_{i=1}^n \bar{P}_i. \quad (3)$$

To agree with D' alambert who considered that the size of the force of inertia  $\bar{F}_i$  is equal to the mass  $m$  of a body increased by the same acceleration  $\bar{a}$  which arises from Newton's

forces  $\bar{F} = m \cdot \bar{a}$  the force of resistance  $\sum_{i=1}^n \bar{P}_i$  which is included in equation (3), appears equal to zero. An output from this contradiction - one: to count, that the acceleration  $\bar{a}_i$  created by the force of inertia  $\bar{F}_i$ , is not equal to the Newtonian acceleration  $\bar{a}$  created by  $\bar{F}$ . To develop in this manner, equation (3) will be written,

$$m \cdot \bar{a} = m \cdot \bar{a}_i + \sum_{i=1}^n \bar{P}_i. \quad (4)$$

Also there is a question: in what physical sense does two accelerations occur? The answer is almost obvious. Inertial acceleration  $\bar{a}_i$  corresponds to the motion of the automobile in a vacuum

with full absence of forces of resistance ( $\sum_{i=1}^n \bar{P}_i = 0$ ). If forces of external resistance are absent ( $\sum_{i=1}^n \bar{P}_i = 0$ ), so

$$\bar{a} = \bar{a}_i. \quad (5)$$

This implies that the true inertial acceleration  $\bar{a}_i$  of a body can be defined in conditions where there is no external resistance. It is quite natural that space experts use such definitions and have experimental confirmation of it.

It then follows, that on a sharing of the forces  $\sum_{i=1}^n \bar{P}_i$  of resistance, they are necessarily a part  $\bar{a}_p$  of the full acceleration  $\bar{a}$ . This is defined in formula (4)

$$\bar{a}_p = \bar{a} - \bar{a}_i = \frac{\sum_{i=1}^n \bar{P}_i}{m} \quad (6)$$

Thus, the size of full acceleration  $\bar{a}$  of the moving body will consist of two components: an inertial component  $\bar{a}_i$  and a resistance to motion  $\bar{a}_p$ . We remark once again, that this was not taken into account for the previous 300 or more years. The inertial component  $\bar{a}_i$  of full acceleration  $\bar{a}$  entered into it, in the disguise of a full acceleration  $\bar{a}$  of a body. This was considered the acceleration created by Newton's force  $\bar{F}$ , which was presumed equal to the force of resistance  $\sum_{i=1}^n \bar{P}_i$ . Thus, the force of inertia  $\bar{F}_i$ , which also interferes with the accelerated motion of a body, is not included into the sum of all forces of resistance  $\sum_{i=1}^n \bar{P}_i$ . This is a fundamental mistake. The force of inertia itself was included automatically into the total force of resistance  $\sum_{i=1}^n \bar{P}_i$ , but all things considered, it is not present. As a result, all experimental factors of resistance to the motion of bodies appear erroneous.

It follows from equation (4), the force of inertia  $\bar{F}_i$  working on the automobile's accelerated motion is equal to

$$\bar{F}_i = m\bar{a}_i = m\bar{a} - \sum_{i=1}^n \bar{P}_i, \quad (7)$$

and the scalar size of inertial acceleration  $\bar{a}_i$  is defined by the formula

$$a_i = a - \frac{\sum_{i=1}^n \bar{P}_i}{m}. \quad (8)$$

The full size Newton's acceleration  $a$  is defined from the kinematic equation of the accelerated motion of a body

$$V = V_0 + at. \quad (9)$$

If the initial speed of the automobile  $V_0 = 0$ , then the full acceleration  $a$  is equal to the speed  $V$  of the automobile at the moment of its transition from accelerated to uniform motion divided by the period  $t$  of accelerated motion.

$$a = V / t . \quad (10)$$

Basically, it is possible to accept the magnitude of the speed  $V$  as equal to the constant speed ( $V = const$ ) of bodies in uniform motion, as the result of accelerated motion. The sum of forces  $\sum_{i=1}^n \bar{P}_i$  of resistance – **experimental size**.

**Thus, there are all data necessary for the definition of inertial acceleration  $a_i$  and the calculation of the force of inertia  $\bar{F}_i$  in formula (7).** It is difficult to see that the size of inertial acceleration  $a_i$  is less than the full (Newtonian) acceleration  $a$ , and D'alambert and his followers considered them equal. Yes, they can be equal, but only under the condition of an ab-

sence of all forces of resistance  $\sum_{i=1}^n \bar{P}_i$  to the motion of a body, for example, in space, far from stars and planets. In space, where there are no forces of resistance, Newton's force  $F$  working on a body in accelerated motion will be directed to overcoming only the forces of inertia  $F_i$ , with the result that Newton's  $a$  and the inertial  $a_i$  will be equal (5). Thus, the share of inertial acceleration  $a_i$  in Newton's acceleration  $a$  depends on the resistance of the environment  $\sum_{i=1}^n \bar{P}_i$  (8).

When the automobile starts to move in regular intervals (fig. 1, d), the force of inertia  $\bar{F}_i$  automatically changes the direction to opposite and the equation of the sum of the forces (3) working on the automobile, becomes

$$\bar{F}_K + \bar{F}_i = \sum_{i=1}^n \bar{P}_i . \quad (11)$$

The essence of this equation is that the uniform motion of the automobile is provided with the force of inertia  $\bar{F}_i$ , and the constant force  $\bar{F}_K$  generated by its engine, overcomes all external resistance  $\sum_{i=1}^n \bar{P}_i$ . The force  $\bar{F}_K$  is constant because the automobile moves in regular intervals and its acceleration is equal to zero  $\bar{a} = 0$ .

And now we pay attention once again to the main centuries-old mistake of mechanics. For this purpose we shall copy equation (11) so

$$\bar{F}_K = \sum_{i=1}^n \bar{P}_i - \bar{F}_i , \quad (12)$$

For more than 300 years, this equation was expressed as

$$\bar{F}_K = \sum_{i=1}^n \bar{P}_i . \quad (13)$$

This means that according to the correct equation (12), that the force of inertia  $\bar{F}_i$  is part of the sum of forces  $\sum_{i=1}^n \bar{P}_i$ , but it was not taken into account. As the sum of forces  $\sum_{i=1}^n \bar{P}_i$  was defined experimentally and were represented as empirical formulas with experimental factors, the sizes of these factors were deformed. Certainly, it is necessary to have a precise representation of the change of direction of the force of inertia at transition from uniform to accelerated or the reverse.

When the automobile passes from uniform motion to accelerated, the force of inertia  $\bar{F}_i$  (fig. 1, d) does not change direction, and its apparent increase  $\Delta\bar{F}_i$  appears directed against motion. At repeated transition of the automobile to uniform motion, the increase  $\Delta\bar{F}_i$  changes the direction to opposite and develops with the former force of inertia,  $\bar{F}_i + \Delta\bar{F}_i$ . Thus, the stage-by-stage increase in speed of the motion of the automobile increases the force of inertia working on it, at the transition to uniform movement.

If the automobile passes from uniform motion (fig. 1, d) to deceleration, the former force of inertia,  $\bar{F}_i$  does not change direction, and the apparent increase  $\Delta\bar{F}_i$ , coincides with it on direction, but at a repeated transition to uniform motion, this increase changes the direction to opposite, and thus reduces the size of the force of inertia  $\bar{F}_i - \Delta\bar{F}_i$  creating from the former uniform motion, a greater constant speed.

It follows that the process of addition of forces  $\bar{F}_i$  and  $\Delta\bar{F}_i$  is geometric and it is accomplished only at the moment of transition to uniform motion.

If we were to switch off a group of transfers of the automobile's active force,  $\bar{F}_K$  will disappear (fig. 1, e) and two oppositely-directed forces will stay: the force of inertia  $\bar{F}_i$  and the sum of forces of resistance to movement  $\sum_{i=1}^n \bar{P}_i$ . As the force of inertia does not have the source supporting it constantly, it appears less as the forces of resistance to movement ( $\bar{F}_i < \sum_{i=1}^n \bar{P}_i$ ) and the automobile, decelerates (fig. 1, e), and gradually stops (fig. 1, b, point C). In view of this, there is reason to name the force of inertia a passive force, which cannot generate acceleration as it is a consequence of acceleration.

Apparently (11), with uniform motion of the automobile, the sum of the forces working on it, does not equal to zero. This implies a new first law of classical dynamics: **A force always operates on a moving body.** We especially note that the presence of this definition of a categorical word always translates the first law of dynamics into something definite.

Now we can reassure pilots. According to the new first law of dynamics, the sum of the forces working on an airplane in regular intervals is not equal to zero (11). The force driving the plane in regular intervals, is the force of inertia which has been directed opposite to its motion when it accelerated into the air. As soon as the plane starts to fly in regular intervals, the force of inertia changes the direction to opposite, and coincides with the force created by the engines of the plane. As a result, the force of inertia starts to provide uniform flight, and the force of the engines allows overcoming the forces of resistance to its flight. Thus, the uniform flight of the plane is to be described by formula (11) in which the sum of forces is not equal to a zero.

We observe that the distance  $S_1$  of the motion of the automobile with acceleration is less than the distance with the delay  $S_3 - S_2$  (fig. 1, b). Its cause is, that  $S_1$ , the size of the forces of resistance  $\sum_{i=1}^n \bar{P}_i$  at the disposal of the automobile is more than the forces of resistance at deceleration because at deceleration, the engine is switched off. It is the main reason for economy in fuel while driving with a periodic de-energized transfer.

**The 3-rd LAW (equality of action and counteraction). The forces with which two bodies (fig. 1, a, poses. 2) operate against each other, are always equal and are directed in a straight line connecting the centers of mass of these bodies.**

On the second position fig. 1, a, it is obvious, that force  $\bar{F}$  of the action of a planet of M on an asteroid A is equal to  $\bar{F} = m \cdot \bar{a}$ , and the force  $\bar{F}_0$  of action of an asteroid on a planet is equal -  $\bar{F}_0 = M \cdot \bar{a}_0$  ( $a, a_0$  -acceleration of an asteroid and a planet accordingly).

As  $\bar{F} = -\bar{F}_0$ ,  $m \cdot \bar{a} = -M \cdot \bar{a}_0$  or

$$\frac{a}{a_0} = \frac{M}{m}. \quad (14).$$

That is, the acceleration of each of two bodies, is inversely proportional to its mass. These accelerations are directed along a straight line. It is necessary to note especially, that the third law of dynamics reflects the interaction of bodies as over distance (fig. 1, a), and at direct contact. In fig. 2, it is shown that at the moment of contact of bodies A and B, the forces  $\bar{F}_A$  and  $\bar{F}_B$  of their interaction are equal in size and opposite in direction. Thus both forces  $\bar{F}_A$  also  $\bar{F}_B$  are forces of an external influence and appear simultaneously.

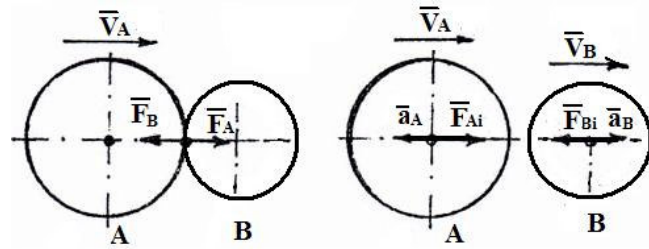


Fig. 2. The interaction of two bodies at contact

The forces of inertia  $\bar{F}_{Ai}$  and also  $\bar{F}_{Bi}$  are equal in size and opposite in direction.

**The Fourth LAW (independence of action of forces).** At simultaneous action on a body or a point, of several forces of resistance to motion  $\sum_{i=1}^n \bar{P}_i = \bar{P}_1 + \bar{P}_2 + \bar{P}_3 + \dots + \bar{P}_n$ , Newton's acceleration  $\bar{a}$  of material point or bodies appears equal to the geometrical sum of accelerations, contributing a share of each of the forces of resistance to the motion

$$\sum_{i=1}^n \bar{P}_i = \bar{P}_1 + \bar{P}_2 + \bar{P}_3 + \dots + \bar{P}_n. \text{ From equation (6) we have}$$

$$\bar{a} = \bar{a}_i + \bar{a}_p, \quad (15)$$

where  $\bar{a}_p$  is the geometrical sum of accelerations of all forces of resistance contributing a share  $\sum_{i=1}^n \bar{P}_i = \bar{P}_1 + \bar{P}_2 + \bar{P}_3 + \dots + \bar{P}_n$ ,

except for the force of inertia. That is,  $\bar{a}_p = \bar{a}_1 + \bar{a}_2 + \bar{a}_3 + \dots + \bar{a}_n$ . Then equation (15) would be written,

$$\bar{a} = \bar{a}_i + \bar{a}_1 + \bar{a}_2 + \bar{a}_3 + \dots + \bar{a}_n. \quad (16)$$

And now we shall recollect the experiment of Galileo in which he placed bodies of different mass and density in a tube. He removed the air and it appeared when arranged vertically, that all bodies fall with the same speed. As according to the second law of dynamics, the force working on a body is equal to the product of mass and acceleration, so it seems that bodies of different mass should move with different speeds. But this is not observed. Why?

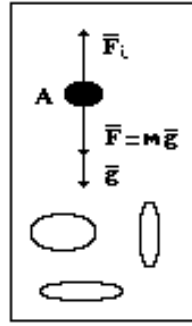


Fig. 3. The action of forces on bodies with air evacuated

Certainly, on the bodies in the tube (fig. 3), gravity,  $\bar{F} = m\bar{g}$  would cause each of bodies to move with a different speed but we do not have such a result. As far as all move with identical speed under one acceleration, two forces must operate: gravity  $\bar{F} = m\bar{g}$  and the force of inertia  $\bar{F}_i = -m\bar{g}_i$ . The accelerated motion of each of them specifies that gravity is greater than the force of inertia  $\bar{F} > \bar{F}_i$ .

Thus, we have a space variant (5)

$$g = g_i \Rightarrow g > g_i . \quad (17)$$

As

$$\bar{F} = m \cdot \bar{g} \Rightarrow m = F / g , \quad (18)$$

that the mass of a material body is equal to its weight  $F$  divided into the acceleration of free-fall  $g$  in a given point on a terrestrial surface.

As a unit of measurement of force in the SI system, (H) is accepted. One Newton - the force, of the weight of 1 kg accelerated over  $1m/s^2$ . In the technical system of units, a unit of measurements of force, 1 kg, is accepted as  $1kg \cdot m/s^2$ . As,  $F = mg$  then  $1kg = 1 \cdot 9,81H$  or  $1H = 0,102kg$ .

Our knowledge of the new dynamics allows us to precisely define the forces of resistance to the motion of any body. The method of definition of these forces follows from formula (13). To determine the forces of resistance to the motion of the automobile, it is necessary to choose a rectilinear and horizontal site of road and cover a set distance with a set constant speed and measure the amount of fuel. The energy of the fuel will be equal to the work of force  $\bar{F}_K$ .

If a similar experiment is carried out on the accelerated motion of an automobile, according to formula (13), the force of the inertia interfering with its motion will automatically enter

the sum of forces  $\sum_{i=1}^n \bar{P}_i$  of resistance, resulting in a definition of the forces of resistance that is completely erroneous.

The driving force will be defined under Newton's second law

$$F = m \cdot \frac{dV}{dt} = m \cdot a . \quad (19)$$

In this case, Newton's acceleration  $a$  is more convenient for definition under formula (10), and the inertial component  $a_i$  under formula (8). The force of inertia will be defined under formula (7), and the acceleration, identifying a share of the forces of resistance, under formula (6).

The second lecture is devoted to the dynamics of curvilinear accelerated, uniform and decelerated motion of a material point. It is currently available to students in Russian.

## SCIENTIFIC AUTHENTICITY CRITERIA

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**Announcement.** This article has aroused great interest among the specialists concerning this issue who have almost all, authentic information on the state of natural sciences. I'd like to supply a comment of one of the scientists to this article. It originates from the comment that it is necessary to unite those people who correct the former errors and develop more realistic direction of cognition of the physical world in which we live.

**Comments:**

### ON THE STATE OF NATURAL SCIENCES

**The first comment: <http://www.inauka.ru/blogs/article94559.html/forum/>**

**Author: Michael Gontsa.**

I accept the scientific opinions of Professor Kanarev, and I think that he has managed to find an amazingly simple criterion of a check of the scientific authenticity of the physical theories. A philosophic essence of the Unity axiom is clear to everybody, but we all paid no attention to it and failed to notice how important it is for scientific analysis. It is Professor Kanarev who has noticed it. The Unity axiom has demonstrated plainly one of the fundamental errors of modern physicists concerning a multipotent role of mathematics in the study of physical processes and phenomena.

Professor Kanarev has shown convincingly that if the dimensional coordinates and time are included into the mathematical models as the INDEPENDENT parameters, such models cannot reflect reality adequately, because these parameters are connected in reality. There are no motions with a change of the coordinates without an associated change of time in the universe. This is another and, one can say, the most convincing argument against a thoughtless confidence in mathematization of physics and other sciences. Mathematic is only a FORMAL apparatus (certainly, rather powerful one), a powerful means of scientific cognition. But mathematics is good and applicable only in the cases when it ADEQUATELY describes and models the corresponding processes. One should understand that mathematics cannot discover a new physical phenomenon, for example, radioactivity or uranium nucleus division, etc. That's why it is necessary to take into account what is PRIMARY and what is SECONDARY. Certainly, physics should be in the first place and mathematics should be on the second place.

Our generation is short of luck: we have got into a dreggy swamp of relativism that has deteriorated physical sciences infinitely, has introduced many absurd ideas, postulates, hypotheses, empty "theories", etc. Please, just think: constancy of velocity of light relatively to every-

thing, deformation of empty space, time slow down, body length reduction, particle mass increase, matching of gravity to lift acceleration, introduction of multidimensional spaces up to 26-dimensional ones and greater, string “theories”, pressure of empty space, Big bang, black holes, dark matter and dark energy, universe expansion with unthinkable velocity, increasing velocity of universe expansion at its “periphery”, impossibility to overcome velocity of light, travel in time, unthinkable tunnels in space, parallel worlds and a possibility of a travel from one world to another and many other things. NONE of these “discoveries” and “inventions” of the relativists has proved out though they keep promulgating with persistence and great range of distribution. Heaps of “scientific” trash concerning relativity theories have been published. The foundations of these theories have even been included into school programs forcedly, but none of teachers of physics understands them. School and universities cripple the young generation putting it off physics. A reduction of those young people who are willing to enter the departments of physics proves it. The leaders of Politphysics have managed to reach the highest levels of the academic and university structures; they have been awarded the highest scientific ranks and positions; they deceive the Nobel committee annually, which grants them Nobel prizes for the erroneous scientific results. Such state of things damages objective development of Physics, Astronomy, Astrophysics, etc., and becomes unbearable.

The representatives of our generation can be proud of many things. We have dealt a blow to all scientific excogitations having proved their complete inability. A discovery made by Professor Kanarev demands complete revision and rethought of physical and chemical science. This process has already started. It is useless to stand against it. Only bullet-headed dogmatists or buzzards can do it. The faster becomes the process, the better and simpler activities connected with education and upbringing of the modern generation and the future ones will be. But one fails to understand incomprehension, silence and inactivity of the authorities of the leading states, including Russia, despite of the multiple joint appeals of thousands of scientists with open letters and calls, for example [www.cosmologystatement.org](http://www.cosmologystatement.org)

**Michael Gontsa**

**July 16, 2009**