

Analyze mistake of the Newton third law

— New object mutual action law

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Abstract: The dynamics experiment indicated, the Newton third law is wrong. So where is it been mistakes? The demand deepest analysis in action and reaction, it of meaning and it of principle. The result is to make person feelings shock, it is really wrong that Newton third law!

Key Words: Newton's law; Action; Reaction; Constraining force; Reaction force in constraint

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0 Introduction

A dynamics experimented, the result of the derivation made person shocked. That be as figure 1:

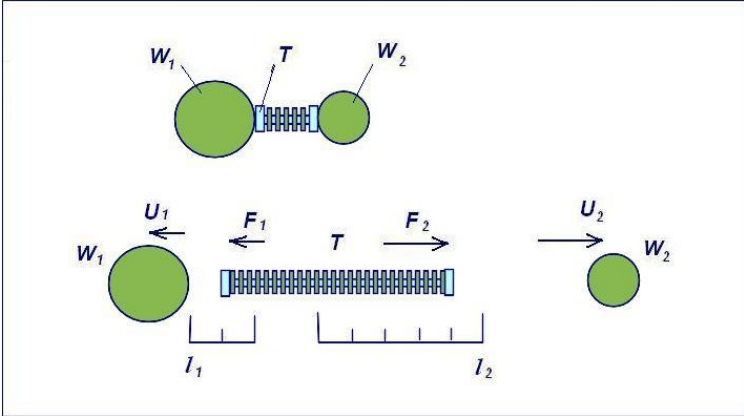


figure 1

The spring T projected, the objects W_1 and W_2 that both mass differ, the momentum of the creation is different, explaining the acting force different two objects suffer. So the Newton third law suffered to queries!^[1,2,3,4,5]

If ain't an actual experiment, who also most unimaginable queries the Newton third law.

1 It is unequal to action and reaction

It is haved in praxis the action and reaction unequal, when compressed a spring with a force, acting force namely is big and reacting force namely is small. According to the Hooke law: $F = kx$. When force action is in the spring, if force equal to elasticity, spring namely quiescence; if force is big to elasticity, spring namely compression(or elongate); if force is small to elasticity, spring namely projected(or shrink).

So while force compression (or elongate) a spring, that action force namely is big to springs elasticity,

$$\text{Namely } F_{\text{action}} - F_{\text{spring}} = m \cdot \frac{du}{dt} - kx \neq 0 \quad (1.1)$$

$$\text{Or: } F_{\text{action}} > F_{\text{spring}} \quad (1.2) \quad \text{and} \quad m \cdot \frac{du}{dt} > kx \quad (1.3)$$

Here outside force F_{action} namely is the action, the elasticity of spring F_{spring} be reaction. So here the action is not equal reaction.

2 Sensors testing

In action and reaction of two objects, use the pressures sensors prosecution test. As the figure 2:

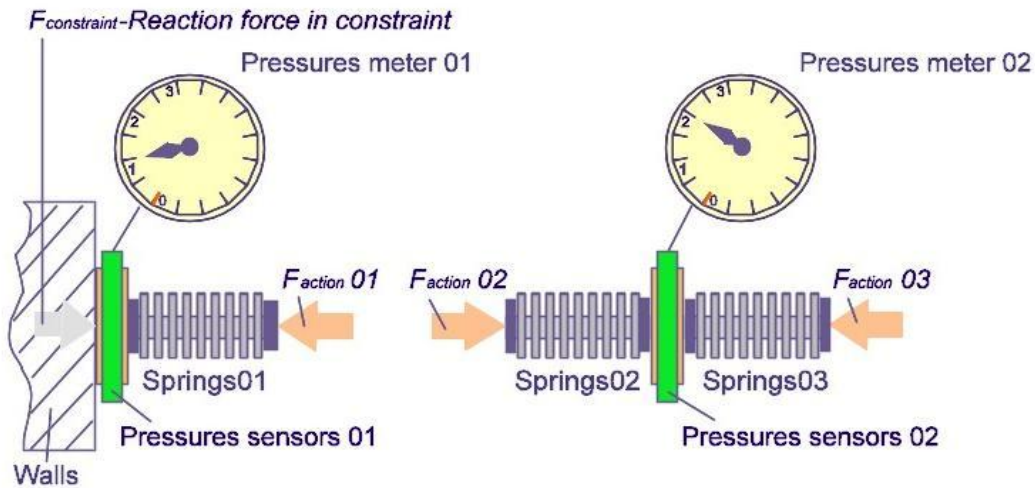


Figure 2

At the figure 2 lefts, the force $F_{\text{action 01}}$ do compressed the spring **Springs01**, another side of the spring **Springs01**, partitions one **Pressures sensors 01** to supported on the Walls. Hypothesis: $F_{\text{action 01}}=1\text{N}$, so **Pressures sensors 01** passed **Pressures meter 01**, namely displaying **1 N** the force. Certainly, here **Walls** too contain a reacting force, namely the $F^*_{\text{constraint}}$ is a reaction force in constraint^[6]. The $F^*_{\text{constraint}}$ is equal with $F_{\text{action 01}}$ bulk, and the direction is contrary. But the constraint force is to do not make the work, therefore it to **Pressures sensors 01**, just the counterchecks act, but have no the thrust act. So **Pressures sensors 01**, a manifestation $F_{\text{action 01}}$ is equal to **1 N**.

$$\therefore \text{ From angles of the statics } F_{\text{action 01}} + F^*_{\text{constraint}} = 0 \quad (2.1)$$

But from the **Pressures sensors 01** the angles of the force that suffers

$$F_{\text{action 01}} + F^*_{\text{constraint}} = F_{\text{action 01}} = 1\text{N} \quad (2.2) \quad \text{and} \quad F^*_{\text{constraint}} = 0 \quad (2.3)$$

At the figure 2 dexter. Both sides of **Pressures sensors 02**. From spring **Springs02** and **Springs03**, apply the **Pressures sensors 02** with the force $F_{\text{action 02}}$ and $F_{\text{action 03}}$. If $F_{\text{action 02}} = F_{\text{action 03}} = 1\text{N}$, So **Pressures sensors 02** is revealed **2N**.

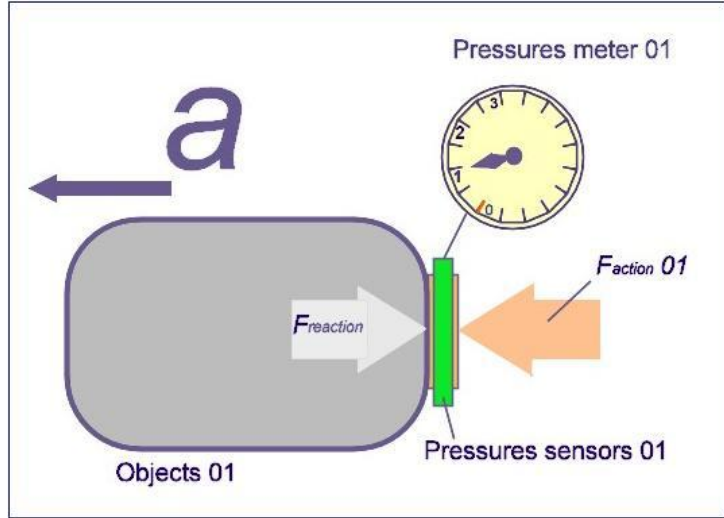
$$\text{Namely: } F_{\text{action}02} + F_{\text{action}03} = 2N \quad (2.4)$$

$$\text{But from the statics angle: } F_{\text{action}02} + F_{\text{action}03} = 0 \quad (2.5)$$

So from figure 2 the lefts revealed, the reacting force do not make the work. It angles in dynamics equal to zero. Namely: $F_{\text{constraint}}^* = 0$.

Figure 3 is a force to make sensor test for object to movement. Among them the acting force $F_{\text{action}01}$ partition the **Pressures sensors 01**. Act in rigid body **Objects 01**. In rigid body **Objects 01**, bring a reacting force F_{reaction} , it is that a kind of inertial force, it is and the objects acceleration direction contrary.

Figure 3



Because the process of action of the above force, is a $F_{\text{action}01}$ first through **Pressures sensors 01** action in **Objects 01**.

Whereupon at $F_{\text{action}01}$ direction formation accelerated motion of the **Objects 01**, it at a certain twinkling of the locomotion is namely:

$$m \cdot a = m \cdot \frac{d^2l}{dt^2} \quad (2.6)$$

Because this kind of locomotion, engender namely in **Objects 01** an inertial force, namely F_{reaction} . F_{reaction} and $F_{\text{action}01}$ the bulk is equal, the direction is contrary.

The above process uses the logic algebras^[7,8,9] to expressed namely:

$$\left[\left(F_{\text{action}01} \Rightarrow (\text{Pressures sensors 01} \wedge \text{Objects 01}) \right) \Rightarrow \left(\text{Objects 01} \wedge \left(ma = m \cdot \frac{d^2l}{dt^2} \right) \right) \right] \Rightarrow \left[(\text{Objects 01} \Rightarrow F_{\text{reaction}}) \right] = 1 \quad (2.7)$$

$$\text{as well as } F_{\text{action}01} = m \cdot a = m \cdot \frac{d^2l}{dt^2} \quad (2.8) \quad \text{and} \quad F_{\text{reaction}} = -m \cdot a = -m \cdot \frac{d^2l}{dt^2} \quad (2.9)$$

Objects 01 the movement — namely the moves and acceleration, entirety is action that from $F_{\text{action}01}$. But F_{reaction} generate in the **Objects 01** inside, it is athletic outcome in of **Objects 01**, thereupon it can't versus **Objects 01** movement, have any reaction. F_{reaction} obviously none versus of **Objects 01** apply work, thereupon it also can't versus other objects apply work. So F_{reaction} is in reverse quiescence force of object fact movement status, it of the being meaning just consist in, making $F_{\text{action}01}$ receive a burthen of force, display the bulk of the burthen of this force.

$$\left(F_{\text{action}01} = m \cdot a = m \cdot \frac{d^2l}{dt^2} \right) \Leftrightarrow \neg \left(- \left(F_{\text{reaction}} = -m \cdot a = -m \cdot \frac{d^2l}{dt^2} \right) \right) \quad (2.10)$$

The formula (2.10) indicate to action the force $F_{\text{action}01}$, and the reaction the force F_{reaction} , the quality is totally different. The $F_{\text{action}01}$ can apply work, the F_{reaction} can't apply work.

From the formula (2.7) of front Can also obtain:

$$\left[(\text{Objects } 01 \Rightarrow F_{\text{reaction}}) \right] \Rightarrow \left[\left(F_{\text{action}} 01 \Rightarrow (\text{Pressures sensors } 01 \wedge \text{Objects } 01) \right) \right] = 0 \quad (2.11)$$

$$\Rightarrow \left(\text{Objects } 01 \wedge \left(ma = m \cdot \frac{d^2l}{dt^2} \right) \right)$$

Therefore, the reaction the force can't equivalence action the force to is clearer at a glance.

Because F_{reaction} can't apply work, so it versus **Pressures sensors 01** can't forming the pressure, **Pressures sensors 01** display the reading of the force, equal to $F_{\text{action}} 01$ the bulk. For example **Pressures sensors 01** if display 1N, so $F_{\text{action}} 01$ is also a 1N.

According to above of analysis, use the sensor test can divide the action and reaction is differ, also can test to in mechanics interaction, of the bulk of the actual action force.

3 The imaginary number quality of the reaction

Still take figure 3 as an example, the F_{reaction} engender in **Objects 01**. Is shown as formula (2.9), it and the displacement of the object is contrary to the direction of the acceleration. Hence question namely engendered, the F_{reaction} is contrary with object acceleration direction, so F_{reaction} namely elephant, is and **Objects 01** together, the direction in reverse to recessive. In formula(2.9) the displacement of the object is negative, then revealed F_{reaction} is recessive.

F_{reaction} is recessive, that course track d^2l of object, on angle from F_{reaction} looked, namely seem a mirror image. Therefore in the F_{reaction} , course trace the d^2l as if is inauthentic, it as if is mendacious.

So concerning reaction, should have the expression of a kind of imaginary number^[10], for instance hereinafter formula (3.1) and (3.2) namely is:

$$\left(F_{\text{reaction}} = -m \cdot a = -m \cdot \frac{d^2l}{dt^2} \right) \Rightarrow \left(F_{\text{reaction}} = m \cdot a \cdot i = \left(m \cdot \frac{d^2l}{dt^2} \right) \cdot i \right) = 1 \quad (3.1)$$

$$\text{and: } F_{\text{reaction}} = m \cdot a \cdot i = m \cdot \frac{i \cdot d^2l}{dt^2} = \left(m \cdot \frac{d^2l}{dt^2} \right) \cdot i \quad (3.2)$$

In formula (3.2), the acceleration a and displacement l is that imaginary number quality of, it is direction contrary to F_{reaction} . Therefore here the F_{reaction} really has no the force of occurrence any action apparently.

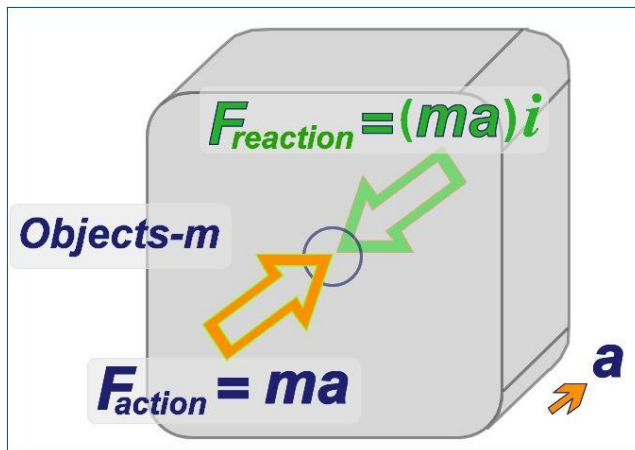


Figure 4

Therefore, When an object in by the action of force, its of complete equation of motion should be:

$$F_{\text{action}} - F_{\text{reaction}} = (m \cdot a) - (m \cdot a) \cdot i = \left(m \cdot \frac{d^2l}{dt^2} \right) - \left(m \cdot \frac{d^2l}{dt^2} \right) \cdot i \quad (3.3)$$

Obviously, in the action process of this force, include an action force and a reaction force, it is a complex number, its real part namely an action force, the imaginary part is a reaction force. Among them, the reaction force of the imaginary part cannot makes the work, it embodiment of is the burthen of the force, it can make between the force and object, using pressure sensor test to force degree size. But it ain't the reason of the object movement.

In figure 4, outer force $F_{\text{action}} = ma$ to act **Objects -m**, but in object inner reaction $F_{\text{reaction}} = (m a)i$, namely seemed to be the $F_{\text{action}} = ma$ a mirror image, thereupon it equal to a force of dummy, isn't it?

So, $F_{\text{reaction}} = (m a)i$ is a mirror image, it is on the dynamic meaning, is an imaginary number physics quantity . It can't makes the work. can't will be the reaction action in, and another object of this object action.

So, the law of newton third is wrong. the objects in two interaction so-called, action and reaction the of direction is contrarily and bulk is equal, thereupon two objects suffer the action of the same the force, its parlance is wrong. Facto, be two object interaction, under most circumstances, two forces that objects suffer respectively are all variant!

4 The reality action forces between the object

Between two objects why would have force the action? This is because the object has the space constraining force in space.

4.1 The space constraining force of the object

The space constraining force of the object be, the object keeps its space the position, and movement state(velocity) is immovability, is it resist the external force the action ability, is the mass of the object. When object is in space, come in for action by the force, it inevitable be apt to resist the action of this force. But the objects resist the external force action the ability, consist in the size of the object mass. When the mass of the object is big more, in the external force actions it of the movement(velocity) changes more small. Whereas on the mass of the object is small more, it in the movement(velocity) of the external force actions is changes more big.

So, the mass of the object namely the space constraining force of the object. The space constraining force of the object resist the action of the external force.

Hypothesis have **A** and **B** two objects, their mass respectively is:

$$A = m_a \quad (4.1.1) \quad B = m_b \quad (4.1.2)$$

Well then the spaces constraining force of these two object be:

$$F_a^* = m_a \quad (4.1.3) \quad F_b^* = m_b \quad (4.1.4)$$

Their total space constraining force is:

$$F_{\text{all}}^* = m_a + m_b \quad (4.1.5)$$

There is very important a concept, namely the space constraining force ratio of the object. It is equaled a object space constraining force, with it and other object the total space constraining force that ratio:

$$F_{a-all}^{\text{ratio}^*} = \frac{m_a}{m_a + m_b} \quad (4.1.6) \quad F_{b-all}^{\text{ratio}^*} = \frac{m_b}{m_a + m_b} \quad (4.1.7)$$

Therefore, by the space constraining force ratio of the object, can actualize between two objects, concerning force the action computation.

4.2 The computation true action force between object

When two objects acts mutually, they differ be the mass, namely each they the space constraining force. Therefore two object to resist the force, inevitable reveal two the contrast of object masses, namely two objects the contrast of space constraining forces. So from these namely determined, two objects suffer the contrast of the force and action force.

For example, the action force of object **A** is F_a the hypothesis, the action force of object **B** is F_b , the then between two objects that total action force be:

$$F_{all} = F_a + F_b \quad (4.2.1)$$

Obviously the action force F_a be by object **A** to in action the force of the object **B**, therefore:

$$F_a = m_b \cdot a_b = m_b \cdot \frac{d^2 l_b}{dt^2} \quad (4.2.2)$$

The a_b is an acceleration for object **B** by the action of force.

Because two objects action mutually, two objects to the holdout of the force is a reveal contrast to the mass. So the action force should is opposite with the space constraining force ratio of the object at this time, namely:

$$F_a = F_{all} \cdot F_{a-all}^{\text{ratio}^*} = F_{all} \cdot \left(\frac{m_a}{m_a + m_b} \right) \quad (4.2.3)$$

Able also obtain with the same reason and with object **B** and the action force F_b :

$$F_b = m_a \cdot a_a = m_a \cdot \frac{d^2 l_a}{dt^2} \quad (4.2.4) \quad F_b = F_{all} \cdot F_{b-all}^{\text{ratio}^*} = F_{all} \cdot \left(\frac{m_b}{m_a + m_b} \right) \quad (4.2.5)$$

Therefore pass the formula (4.2.3) and (4.2.5), namely may from total action force F_{all} , but obtain the correspond proportion the action force F_a and F_b .

From the formula: $F_a = F_{all} \cdot F_{a-all}^{\text{ratio}^*}$ and $F_b = F_{all} \cdot F_{b-all}^{\text{ratio}^*}$ can also discover, action force F_a and mass m_a be in direct proportion, F_b and mass m_b also be in direct proportion. Namely two objects action mutually, object of big mass, will bring the larger force, to the object of small mass the action. Vice versa, object of small mass, bring the small force, to the object of big mass the action.

Therefore that two differ mass the object on interactional, they the action force of is different. This complete upset the concept of the Newton third law.

4.3 Action force and mass geometric proportion

Well then the interaction between objects and objects, and between they the mass contrast what about? Look first the force F_a and force F_b the ratio.

$$\frac{F_a}{F_b} = \frac{F_{all} \cdot F_{a-all}^{\text{ratio}^*}}{F_{all} \cdot F_{b-all}^{\text{ratio}^*}} = \frac{F_{a-all}^{\text{ratio}^*}}{F_{b-all}^{\text{ratio}^*}} = \frac{m_a}{m_a + m_b} \cdot \frac{m_a + m_b}{m_b} = \frac{m_a}{m_b} \quad (4.3.1)$$

$$\therefore \frac{F_a}{F_b} = \frac{m_a}{m_b} \quad (4.3.2)$$

So the force F_a and force F_b ratio with mass m_a and m_b ratio is an geometric proportion.

$$\text{Be got by formula(4.3.2):} \quad \frac{F_a}{m_a} = \frac{F_b}{m_b} \quad (4.3.3)$$

When two objects action mutually, the action force of the object and the ratio of the mass, is same in two objects.

$$\text{Be got by formula (4.2.2), (4.2.4) and (4.3.2):} \quad \frac{F_a}{F_b} = \frac{m_b \cdot a_b}{m_a \cdot a_a} = \frac{m_a}{m_b} \quad (4.3.4)$$

And then:

$$\frac{m_a}{m_b} = \frac{m_b \cdot a_b}{m_a \cdot a_a} \quad \text{and} \quad \frac{m_a \cdot m_a \cdot a_a}{m_b \cdot m_b \cdot a_b} = \frac{1}{1}, \quad \frac{m_a^2 \cdot a_a}{m_b^2 \cdot a_b} = 1, \quad (4.3.5), \quad \text{and} \quad \left(\frac{m_a}{m_b}\right)^2 = \frac{a_b}{a_a} \quad (4.3.6)$$

So, object **A** and object **B**, the square of the mass is equal with the product of the acceleration. And, the mass of the object **A** and the square of the ratio of the mass of the object **B**, is equal to the acceleration of the object **B** and the ratio of the acceleration of the object **A**.

Therefore, to this with the circumstance of the Newton third law, there is very big differ.

4.4 The action force ain't inertial force of reaction

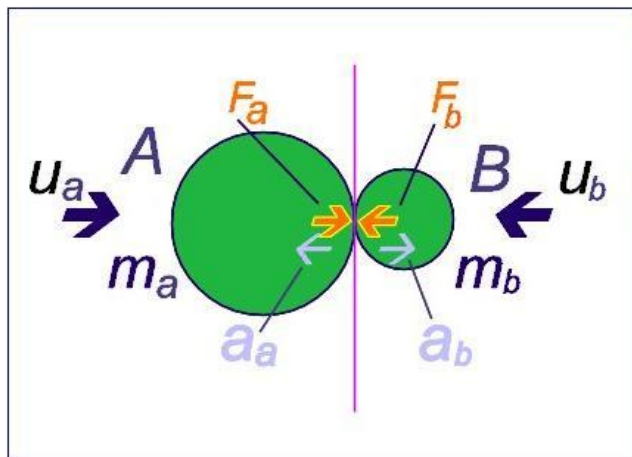
We always deem, when the object get action by the force, an inertial force the producing, namely be versus another the reaction force of an object. And according this concept, namely can gain the conclusion of the Newton third law. But, we discover now, while the object by external force action, it obtain the reaction inertial force, it is the force of the imaginary number in fact. Therefore, it incapability is used as the action force, to another object formation thrust.

This point suddenly on looking, apparently very difficult comprehension, but the actual circumstance namely is this.

Such as the figure 5, the object **A** and object **B** mutually collide. **A** to **B** collide force is:

$$F_a = F_{all} \cdot \left(\frac{m_a}{m_a + m_b}\right) = m_b \cdot a_b = m_b \cdot \frac{d^2 l_b}{dt^2} \quad (4.4.1)$$

Figure 5



B to **A** impact force is:

$$F_b = F_{all} \cdot \left(\frac{m_b}{m_a + m_b} \right) = m_a \cdot a_a = m_a \cdot \frac{d^2 l_a}{dt^2} \quad (4.4.2)$$

Because $m_a > m_b$, so $F_a > F_b$, and $m_b \cdot a_b > m_a \cdot a_a$.

Obviously the inertial force in the **A** is namely:

$$-(m_a \cdot a_a) = -\left(m_a \cdot \frac{d^2 l_a}{dt^2} \right) \quad (4.4.3)$$

The inertial force in the **B** is then:

$$-(m_b \cdot a_b) = -\left(m_b \cdot \frac{d^2 l_b}{dt^2} \right) \quad (4.4.4)$$

So at this time inertial force in the **A** less than from impact force that it bring, but inertial force in the **B** biggish than from it impact force for producing. Therefore explaining action force ain't engender by inertial force of reaction.

Action force ain't that circumstance of the inertial force of reaction is many. For example when an object, the impact and compressed a spring, the spring make object decelerated, as a result produce the inertial force in object, is equal with the elasticity of the spring. And at this time the action force of the object biggish than spring elasticity, so it the action force impossible is an inertial force.

We isn't difficulty to discover now, two objects action mutually, for example while collide, object **A** and object **B**, all wish to burst through the other side, but the oneself keep immovability. Therefore at this time the big mass the impact force is big, the small mass the impact force is small. But these two impacts force, F_a and F_b is from **A** and **B** the space constraining force namely the mass, and two objects the relative velocity and to exclude one another the character, the engender. It of formation, do not the need, after object get action by the force, just now the reaction inertial force that engender. So, the action force of the object, don't is an inertial force.

5 New object mutual action law

The Newton third law is wrong, new the law of mutual action of object, should establish. Below is a new object mutual action law:

When two objects action mutually, two objects are each from all engender the action force, the other side to action. At this time two object from producings the action force to it the ratio, is equal to these two masses of object it the ratio. Then big action force in creation in big object in mass; small action force in creation in small object in mass.

This is the new laws of motion concerning object mutual action.

Anent the movement of the object, must adopt the new object action the law, then can make the accurate computation.

6 The momentum is not conservation

The newton third law is wrong, so because the newton third law the theory of the proposal, namely being

doubt. For instance the law of conservation of momentum, this importance physics law, namely can by testify been wrong.

According law of action and reaction, a matter system when the resultant external force suffered is a null, its total momentum hold is constant.

$$\text{Namely: } \sum m_i v_i = \text{Constant} \quad (6.1)$$

But according to new object interaction law, a matter system when the resultant external force suffered is a null, its within interaction of any object, all may do its total momentum occurrence change.

For instance, when two masses dissimilar object, come the action mutually, two objects suffer the action of the dissimilar force in each.

$$\text{Namely: } F_a = F_{all} \times \left(\frac{m_a}{m_a + m_b} \right) = m_b \times a_b = m_b \times \frac{d^2 l_b}{dt^2} \quad (6.2)$$

$$\text{And } F_b = F_{all} \times \left(\frac{m_b}{m_a + m_b} \right) = m_a \times a_a = m_a \times \frac{d^2 l_a}{dt^2} \quad (6.3)$$

Please watch for, two differ of object interaction forces, be by total action force versus two differ of object space constraining force ratios, and that represent to come out. Thereupon, from two differ of object space constraining force ratios, namely induce two differ of the interaction force of objects.

Here do two forces each multiply t, namely receive the impulse of the force. But the impulse of the force namely the change of the object momentum. Therefore, sum the vector quantity of the impulse of the object and, it be unequal to the null. Namely express the momentum of the system, to is the change.

$$\text{Namely: } F_a \cdot t = m_b \cdot a_b \cdot t = m_b \cdot \frac{d^2 l_b}{dt^2} \cdot t = m_b \cdot v_b \quad (6.4)$$

$$F_b \cdot t = m_a \cdot a_a \cdot t = m_a \cdot \frac{d^2 l_a}{dt^2} \cdot t = m_a \cdot v_a \quad (6.5)$$

$$\because m_a \neq m_b \quad \text{and} \quad F_a \neq F_b \quad \therefore (m_b \cdot v_b) \neq (m_a \cdot v_a) \quad (6.6)$$

$$\therefore (F_a \cdot t) - (F_b \cdot t) = (m_b \cdot v_b) - (m_a \cdot v_a) \neq 0 \quad (6.7)$$

Therefore, the law of conservation of momentum is wrong. In overwhelming majority object interaction, the momentum may all is not conservation.

According to this principle, at two masses differ the object, while occurrence collide. If is big mass that object, versus object of small mass, it to collide, then two object total momentum, will become after hitting big. Contrarily, if is small mass that object, collide object of big mass, then two objects the total momentum, after collide will diminish.

Thereupon, in a matter system, by its inner the object interaction, total momentum of this matter system, is may become big, also may become small.

7 Diversiform instance to true action force between object

Two objects action mutually, big object in mass, generate the bigger action force. Small object in mass, generate the small action force. Such of instance no absoluteness. It in fact and only when two objects all has the higher structure intensity be useable.

If two objects action mutually, the small object in mass is a rigid body, but big object in mass, the structure intensity is lower. Then possible in action process, the big object occurrence structure destroy, but its fraction that occurrence destroy, the density is small in the mass. Thereby at here actually, small object in mass in two objects, will generate the larger action force. But happened destroy the big object, generated the small action force however.

Thereupon, object interaction, two objects action the dimension of the force, will because two objects material differ, to complicates. Small object on small mass, versus big object on big mass, generate the larger action force, this is the complete in possible. For instance, the meteorite is small, the Earth is big, but a aerolite in falling, will hit in the ground, a big meteorite crater.

According the action and reaction law, humans being manufacture and use monstrous rocket, transmit cosmos airship. But even if according the action and reaction law, the efficiency of the engine of rocket also is low-down. Because in such case, the reaction makes the matter in small mass, acquire more kinetic energy. So, the rocket fuel is burnable, energy that generate, the majority was all taken by the eruptive fuel. But rocket per se, the kinetic energy of the acquisition, then want to be small a lot of. As long as look the overall mass of the fuselage of rocket, to a instantaneous the mass of fuel in that rocket jet in it ratio, namely awareness both use energy the very wide gap.

Now, according to new object action law, two object on mutual action, big object in mass, generate the larger action force. So when the rocket operated, from force that fuel jet fuel take, will be more. Thereupon this explain, the fuel use efficiency of rocket, compare when it using law of action and reaction in reckon, that be much lower. So, the engine of rocket really is a the high-energy consume, however efficiency very low the equipment.

According new object mutual action law, concerning universal gravitation; concerning the computing in cosmos celestial bodies move, the likelihood also wants to proceed the some modification. For instance the gravitation between two celestial bodies, the big celestial bodies in mass envisage the small celestial bodies in mass, its the gravitation should be big; the small celestial bodies in mass envisage the big celestial bodies in mass, its the gravitation should be small. Thereupon, this is differ with newton third law. Afresh to the move of celestial bodies do computing, very may have the new discovery.

8 Summing-up

My text testify newton third law is wrong. But the text still keep to the newton first law and second law, and according to done versus the testify of the error of the newton third law. Who too the cannot denies, the laws of motion of newton for human science, have the extremely important meaning. Particularly is newton third law, the human being namely depend on it to directed, that industrial revolution that achieve realizing the world range, and the science technical to progress unremittingly.

But science hanker is the verity, that advancement the science requires continuously, when we detect in inhere theory has error, do corrected error is a imperative at inevitable. In this way namely can achieve the scientific advancement.

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