

ON THE PRINCIPLES OF MATTER MOTION IN SPACE AND TIME

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Abstract. *One reconsiders the well-known principles of matter motion in space and time, retaining for the inertia principle the name of motion conservation principle and introducing a new principle of the space treble entity, that explain the composition and decomposition theorem of the vectorial magnitudes and permit a good understanding of the equations transformation, necessary to the relative motions.*

These considerations have a special importance in our recent studies after the years 1990, concerning the relative motions of the real fluids in mobile trihedrons being in a rotational or translation motion with respect to a fix trihedron, with outstanding results in the theory of turbo machines, of ocean currents and magnetic terrestrial poles, pipe vibration, tire hydroplaning, wave propagation, etc.

Keywords: Matter motion in space and time. Matter motion principles

1. The reason to write the present paper

For a better understanding of the undertaken research in the field of the relative motions [1-13], /1-4/ introduced by us after '90 years, I shall make a few clarifications concerning the motion principles of the material substance in our three-dimensional space, which question captivated the researchers: physicists, mathematicians and philosophers beginning from the Renaissance age, having in view the uncertainty of the truths, discovered previously or even by them.

The remedy was searched by René Descartes (1596-1650), proposing the doubt in the scientific rationalism [14], but the solution being given by Benjamin Franklin (1706-1790), physicist, economist and American politic man, the inventor of the lightning rod in 1776, renowned also by his Morale Law, whose first precept is „the thinking continuity on the same subject”.

The importance of these clarifications has a special scientific interest, the more so because in the former period in our political space, when at the Union Congress of Mechanics held in Moscow in 1953, the Soviet materialist participants took Albert Einstein in arms and after his too simple and incorrect formula $E = m c^2$ have decided that the energy has mass and also weight, ignoring the corpuscular structure of the electro-magnetic radiation, proved already for the solar light by the radiometer of Sir William Crooks (1832-1919).

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2. The motion conservation as the first principle of the matter motion

Concerning the first principle of matter motion [15], formulated yet by Galileo Galilei (1564-1642), with the occasion of his studies on bodies free fall laws, under the name of **inertia principle**, I consider that a more suitable expression was given by René Descartes (1596-1650) under the name of **impulse conservation law**, although his recommended doubt concerning the establishment of the thrusts authenticity, that made also Isaac Newton (1642-1727) to express the first axiom of the motion under the form [16, p.150] *any body conserves its state of rest or uniform motion in straight line, if it is not coerced by imparted forces to change its state*, with our observation that the rest state could necessitate a fixed absolute referential, thinking also and to the relative motions.

Reunifying these beautiful thrusts and allowing possibility for the future discoveries, I could define as the **first principle** of the Mechanics **the principle of motion conservation of a body in absence of any forces** (causes, that should be able to modify his motion), **his motion producing in the same spatial direction** (to see also the § 3), which may be even a curved line, if the space should have curvature, as claim in the present some researchers.

Communicating this idea to my formerly distinguished professor of Technical Mechanics Aurel Perșu at the Polytechnic Institute of Bucharest, inventor of the aerodynamic car in 1922 and fervent fighter for the recognition of the inertia force reality [17], he agreed this idea, only has objected me that I not précised however what a motion describes the body, that I wanted neither to make for the translation motion, because he for example added at the inertia principle also the body rotation motion with constant angular velocity around an axis passing by its weight centre, by application of a force couple.

3. Isaac Newton's action principle as the second principle of the Mechanics

As concerns the second motion axiom formulated by Isaac Newton, as that [16] *the motion variation is proportional with the imparted moving force and is directed after the straight line, in whose length is imparted the force*, we shall completed this **second motion principle** in the sense of the third Newton's axiom, that *the reaction is always contrary and equal with the action*: or that *the reciprocal actions of two bodies are permanently equal and directed in contrary senses* (the **force duality principle** of our professor Aurel Perșu [18]), establishing in this kind the energy conservation principle. To allow a chance also, to Albert Einstein's theory for the mass variation with the body velocity, we shall write the equilibrium relation between the acceleration force, exerted upon the mass m of a body and his inertia force, as well as the mechanical work expression, equal with the kinetic energy, which represents the mechanical work of the inertia force in the conception of my renowned professor Aurel Perșu [17-20].

$$F_a = m a = m \frac{dv}{dt} \quad \text{and} \quad L_{\text{mec}} = \int \vec{F}_a d\vec{s} = \int m \frac{d\vec{v}}{dt} d\vec{s} = m \int \frac{d\vec{s}}{dt} d\vec{v} = m \frac{v^2}{2}, \quad (1)$$

after which the mass of a body was defined as *its capacity of inertia in any space direction* and in this case we could us imagine in Einstein's philosophical sense, that its capacity to store the motion $m = m(v)$, may be different at diverse velocities, as well as could be at the same time the value variation of an electric condenser capacity for different electric voltage.

4. Treble entity of the space, as the third principle of the matter motion

Finally to understand more better all the anterior considerations concerning the notions of **space** and **time**, introduced even by the famous Newton's professor, Isaac Barrow (1630 - 1677), one of the precursors of infinitesimal calculus, which said that [16, p.192] *the time is the permanence of a thing in its existence*, or afterwards that *the time is not the actual existence, but the possibility of a durable permanent existence, as well as the space signifies the existence capacity of the magnitude*, that were afterwards considered as fundamental notions of maximal generality, named - *categories* by the illustrious philosopher Immanuel Kant (1724-1804) [15], which propelled the sciences in their upsurge after the Renaissance Age, defining the notions proper to scientific reason, that come from the priory forms of the cognition or of knowledge's which exist anterior of sensorial experience and are independent of it, as well as the space and the time, by which one conceives the development of the matter motion, founded by the experience and reasoning of truth induction and not of its deduction from the reasoning's of the antiquity philosophers.

He introduced by Gnosticism the human capacity to be able to known, as well as the active roll of the subject, therefore of the Subjectivism in so called objective cognition, recognised by all scientific people. With the purpose to introduce the third principle of the matter motion I shall made the following reasoning, which results from a certain imaginative experience. Supposing that upon a body we have imparted a certain motion in a space direction by exerting of a force. To the same body we can imparted yet another supplementary motion, perpendicularly on this direction with the aide of another force, but without to can modify the first motion. Finally, there exists once more a single and last possibility to impart upon the same body a third and last motion, perpendicularly on the plane of the two anterior directions, but without the possibility to modify the two anterior motions.

As following of this physical reality we shall define **the third principle of Mechanics** as the **principle of Space treble Entity**, which offers to the space a oneself existence (*in se*) independently of the impenetrable matter existence, reason for that the three space variables X, Y, Z (the fourth being not given) are of

mathematical point of view **independent variables** between them, and from that reason we can compose and decompose the vectorial physical magnitudes of the material substance oriented in space as: forces, velocities, accelerations, moments, only on three orthogonal directions, anyone should be these. With that occasion we shall remark the geniality of Leonhard Euler's (1707-1783) conception, which glimpsed correctly the reality of the non-permanent flow of an ideal fluid, writing its motion equations with partial differentials.

5. On the time notion, characteristic to the matter motions

Concerning the physical notion of time, this is not evidently a fourth spatial dimension, but after the correct intuition of the professor Isaac Barrow a specific duration to the production of different motion phenomena, which spend at diverse structural levels of the matter: mechanical motion of solid bodies, thermal motion of the molecules, chemical motion of the atoms both dependent on the temperature, biological motion of the substances in the human body processes, etc., from mechanical point of view, the time to produce a phenomenon being measurable even by a mechanical motion, but which must be produced in a perpendicular direction, independently by that on which take place the first motion, for example the mechanical watch, as well as the electronic, chemical or biological watch (for instance the core pulse).

Conclusions

- (1) The formulation of the space three-entropy principle is very important to explain the composition and decomposition theorem of the vectorial physical magnitudes, as well as the possibility to measure the time going, using another material motion on an independent space direction or another phenomenon of different nature.
- (2) Resuming the mass notion definition given by Aurel Perșu [18-20], as the body inertia capacity in any space direction, one leave also the possibility to Albert Einstein's idea, that this capacity of a body to store the motion should be variable for different velocity.
- (3) These clarifications are very interesting for the relative fluid motions [21].

Acknowledgment

I want to express my gratitude for my formerly distinguished professor of Technical Mechanics Aurel Perșu at the Polytechnic Institute of Bucharest 1947-48, inventor of the aerodynamic car in 1922 and fervent fighter for the recognition of the inertia force reality [17], for the courage of a veritable scientist to communicate us his original points of view in the field of Mechanics concerning the notion of mass, inertial force and energy in that obscurantist period of monopolization of all the opinions and publications by the political power, imposed to Romania after the 2nd World War.

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