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Inversion of Time and Space in the Classical Kinematics of Material Point

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ABSTRACT

Simultaneous inversion of space and time has examined in all double-reversible movements of material point in classical kinematics. It is shown that each double inversion of movement accurate within the nearest additive constant coincides with the initial non-inverting movement. Some fundamental conclusions from the inversion of time and space in classical kinematics were discussed.

Keywords: Inversion of Time and Space

I. INTRODUCTION

In works [1] and [2] we have examined separately the inversion of time and the inversion of space in classical kinematics of material point. The question has been asked - what happens with the movements, which are reversible in both cases, in case of simultaneous inversion of space and time?

II. METHODS AND MATERIAL

A. Inversion of time and space

To answer this question, we shall consider the simplest example of constant straight-line motion, which is reversible with relation to the space and time (Figure 1). Herewith we shall consider that the order of inversion of space and time is not important for the movement.

First we shall invert the space (Figure 1 - right side), and then we shall invert the time (Figure 1 - left side). Accordingly, the straight and reverse laws of velocity and movement after both inversions are:

$$\vec{\mathbf{v}}(t) = \vec{\mathbf{v}}_{\mathbf{0}} = const$$
$$\vec{\mathbf{v}}'(t') = \vec{\mathbf{v}}'_{\mathbf{0}} = const$$
$$\vec{\mathbf{v}}''(t'') = \vec{\mathbf{v}}''_{\mathbf{0}} = const$$
$$x(t) = x_0 + \mathrm{v}_{0x}(t - t_0)$$
$$x'(t') = x'_0 + \mathrm{v}'_{0x}(t' - t'_0)$$
$$x''(t'') = x''_0 + \mathrm{v}''_{0x}(t'' - t''_0)$$

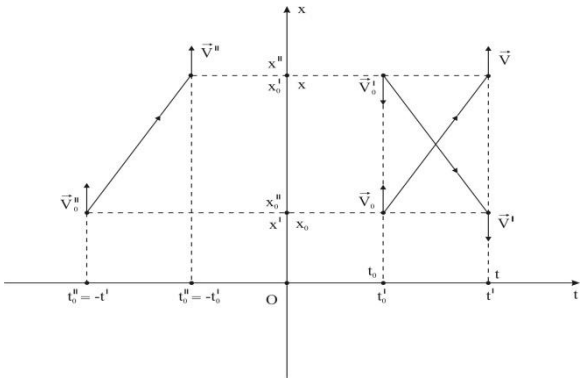

Figure 1 : Example of inversion of space and time

It is seen from the figure that after double inversion of space and time, the final movement accurate within the additive constant (due to the change of the sign of the moments of time $t'' = -t'$) coincides with the initial movement.

It follows mathematically from the laws of velocity and movement:

$$\vec{\mathbf{v}}''(t'') = \vec{\mathbf{v}}''_{\mathbf{0}} = -\vec{\mathbf{v}}'(t') = -\vec{\mathbf{v}}'_{\mathbf{0}} = \vec{\mathbf{v}}(t) = \vec{\mathbf{v}}_{\mathbf{0}} = const$$
$$x''(t'') = x''_0 + \mathrm{v}''_{0x}(t'' - t''_0) = x_0 - \mathrm{v}'_x[-t'_0 - (-t')] =$$
$$= x_0 + \mathrm{v}_{0x}(t' - t'_0) = x_0 + \mathrm{v}_{0x}(t - t_0)$$

The result - the final double inverted movement to coincide with the initial movement - is in force for all double revertible movements (all constant movements). This conclusion is expected, since the difference between the inversion of space and time consists in alteration of direction of the tangential acceleration and

alteration of the nature of the movement. At constant movements, which are double reversible, both these effects are absent.

III. RESULTS AND DISCUSSION

In conclusion of this work will note the following:

1. Let imagine that in the world where we live, there are not any dissipative and cumulative forces. Then the movements are reversible in time and we shall not be able in any way to understand the direction they flow - from the past to the future or vice versa.
2. Imagine that in the world in which we live are absent all the forces that have a particular source in space. Then the movements are reversed in space and we shall not be able in any way to understand what its condition is - inverted or not.
3. Imagine, finally, that all tangential forces are absent in the world. Then the movements are reversible in time and space and we shall not be able in any way to understand neither what the direction of time is nor what the state of space is. In such a world only constant movements (straight-line and curvilinear) and rest exist.

All this is reflected not only in kinematics, but in all classical physics as well.

IV. REFERENCES

[1]. Z. Peykov, T. Spiridonov, A. Apostolov, *Inversion of Time in the Classical Kinematics of Material Point*, IJSRST, V.2, №4, p.116-125, 2016.

[2]. Z. I. Peykov, A. Apostolov, *Inversion of space in the classical kinematics of material point*, Z. I. Peykov, A. Apostolov, presented for publishing.