PMC-topology [1)]

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In the mathematical description of physical phenomena is used mainly the point-metric classical topology (*PMC*-topology), embodied in the methods of mathematical analysis. It is necessary to note the important features of the application of *PMC* -topology to the solution of the problems of space-time relations, which will give us an unambiguous hint at the limitations of its applicability. To understand the reasons for limiting its application in space-time relations in physics, it is necessary to return to the origins of the concept of continuity of the classical topology of a point metric.

The carriers of conceptual spatial relations in *PMC*-topology are dimensionless points. Accordingly, it is necessary to confirm the possibility of the existence of physical objects that do not have sizes that may be represented by points. In the physics by the carriers space-time relations are point *events*. Let us examine several theorems of mathematical analysis and find out how the points of conceptual space correlate with the point events of space-time relations in physics.

An important property of the conceptual space is its *completeness*: *the space R is called complete if any Cauchy sequence is fundamental there.* The concept of completeness of space ─ the basic for mathematical analysis and ensures the applicability of a powerful apparatus of mathematical analysis. The property of completeness of the space allows to introduce the concept of proximity elements, *the genetic identity of the points* in the motion, to clearly define the limiting properties of the sets of convergence, limit and other logically related moments and elements of differential and integral calculus. The convergence of sequences, limit transitions, that is, the topological properties of space is formalized by the introduction of a space metric to determination the proximity of elements.

The following theorems of mathematical analysis can be used as the basic criteria of completeness of metric space:

1. *In order for the metric space R to be complete, it is necessary and sufficient that in it any sequence of*
   nested closed balls whose radii tend to zero, had a non-empty intersection. This statement is known as the nested ball theorem. In other words lets say this: by reducing the dimensions of the ball (using the property of metricity of space), can be infinitely close to the center of the ball (topology of "tightness"). The center point of the ball exists by the completeness of space. From a physical point of view, the concepts of distances, their measurements and the proximity of point elements of space became very clear.
2. *Every metric space R has replenishment, and this replenishment is unique up to isometry leaving fixed points from R.* This theorem suggests the possibility of replenishing the metric space, but with the possible occurrence of extraneous (fictitious) events due to the completion of the space. A priori endowment of real space-time relations with the completeness property leads us to the Newtonian concept of continuous space-time.
3. *The complete metric space R cannot be represented as a union of countable number of nowhere dense sets.* This statement (Bell's theorem) correlates our conceptual reasoning with the possibility of comparing them with experience and states the impossibility of representing a dense space by a limited number of dimensions (and even their infinitely countable number).

[1)] **I beg your pardon for my not very good English!** The original text in Russian**: http://vixra.org/pdf/1804.0400v1.pdf**

To avoid confusion here, the term space will be refer to the conceptual space with which mathematics works. In the physical context, we will talk about space-time relations. The necessity of distinction between these concepts is obvious.

Thus, the main features of *PMC*-topology application to the solution of space-time problems are the following:

When considering problems in which the size of physical objects is much smaller than the characteristic size of the systems under consideration, *PMC*-topology is an acceptable approximation. However, there are problems associated with the" birth " of fictitious events in the replenishment of space (for example, in the CTR when considering the Twin Paradox).

- The occurrence of fictitious events in force 2° and the inability to empirically confirm the completeness of the spatial-temporal relations of physical events in force 3°.
- In addition, in the microworld there are no objects which can be provided by points of conceptual space.
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V.A.Kasimov. *PMC*-topology

Abstract
In the mathematical description of physical phenomena is used mainly Point-Metric Classical topology (*PMC*-topology), embodied in the methods of mathematical analysis. It is necessary to note the important features of the application of *PMC*-topology to the solution of the problems of space-time relations, which will give us an unambiguous hint at the limitations of its applicability. To understand the reason for this limitation, it is necessary to return to the origins of the continuity concept of point-metric classical topology.