Summaries

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Michał Heller

Cosmological singularities and noncommutative geometry

In the previous paper (*Filozofia Nauki* 2, 1994, nr 3-4, s. 7-17) we have shown how the initial and final singularities in the closed Friedman world model can be analysed in terms of the structured spaces in spite of the fact that these singularities constitute the single point in the b-boundary of space-time. In the present paper we generalize our approach by using methods of noncommutative geometry. We construct a noncommutative algebra in terms of which geometry of space-time with singularities can be developed. This algebra admits a representation in the space of operators on a Hilbert space, and the initial and final singularities in the closed Friedman model are given by its two distinct representations. The striking feature of this approach is its analogy with the mathematical formalism of quantum mechanics.

Jerzy Gołosz

Some argument in favor of substantivalism

In the article I subject to criticism Field's argument, according to which field theory takes space-time to be a substance, since it ascribes field properties to space-time points. The fundamental flaw of this argument, I suggest, is the incompatibility of Field's interpretation of field theory with the way this theory is understood and utilized by its users, namely scientists. My criticism is based on the assumptions that one cannot propose an ontology of a given scientific theory at the same time imposing on it an interpretation which clashes with the interpretation current among its users. I also suggest that in order to establish the ontology of a scientific theory one should take into account not only the way it functions but also the way it has been constructed. According to this criterion, field theory does indeed take space-time to be a substance.

Leon Koj

Scientific theories as dynamic systems

In the first part of the paper three concepts of system are introduced.

The first is the following ordered set: $S = \langle C, R_1, ..., R_k, R_{k+1}, ..., R_{k+m}, U\rangle$, where S is a given system, C is the set of its parts, $R_1, ..., R_k$ are relations between these parts, R_{k+1}, ..., R_{k+m} are relations between parts of S and its environment U. This concept does not take into account the fact that real things change. Thus it is the concept of abstract system.

The second concept takes changes of systems as granted. At every period i the system is slightly different. At the periods i S^i is a set of sections of a real system: $S^i = \langle\{C\}^i, \{R_1, ..., R_k\}^i, \{R_{k+1}, ..., R_{k+m}\}^i, \{U\}^i\rangle$, where $\{C\}^i$ is the set of sets of parts cf S, $\{R_1, ..., R_k\}^i$ and $\{R_{k+1}, ..., R_{k+m}\}^i$ are sets of relations.

Different sections of a system are similar; the same holds for the relations and the subsequent environments. To describe the evolution of systems these similarity-relations have to be considered. Let the relations between the C's, the parts of the system, be symbolized as X, the similarity relations between the $\{R_1, ..., R_k\}$ pointed to by T and the relations between the other sets of relations marked by Z. Let W be assigned to the relations between the successive environments. S^I is a system which lasts during the period I and changes in this time. The period I is in fact identical with i. The symbol S^I was introduced to point to the relations S, T, Z, W, which were absent in the definition of S^i. Now we have the following third concept of system: $S^I = \langle\{C\}^i, X, \{R_1, ..., R_k\}^i, T, \{R_{k+1}, ..., R_{k+m}\}^i, Z, \{U\}^i, W\rangle$.

In the second part of the paper the relation X is analyzed, when C consists of statements and S is a theory. The relation is to the effect that statements of later stages of a theory refer to n-tuples which exhibit more arguments that the relations spoken of at earlier stages of the theory.

Renata Ziemińska

Intensionalism and foundationalism in epistemology

Contemporary philosophy (at least in English-speaking world) is dominated by discussions between foundationalism and externalism on the other hand. R. Chisholm defends foundationalistic and internalistic position. Epistemological foundationalism is the thesis that there are basic beliefs which are the foundation for the justification of others. According to Chisholm such basic beliefs are: some simple truths of reason and some beliefs about the self-presenting states like thinking, seeming or sensing. There are some problems with such basic beliefs, but Chisholm's main important argument is that there is no alternative to foundationalism in epistemology, because its opponent. the coherence theory, presupposes some form of foundationalism.

The disscusion betwen internalism and externalism is more recent. Externalism claims that what makes our beliefs justified is something external to subject. It may be truth, causal relations or counterfactual relations. According to Chisholm all externalistic theories are either empty (they reduce justification to truth) or they use some internalistic concepts. He gives some counterexamples to the theory by A. Goldman (one of the most important proponents of externalism). Internalists claim that what can make our beliefs justified must be something internal, accesible to subject.

Marek Łagosz

Frege's category of unsaturatedness

Frege's category of unsaturatedness (incompleteness) is a central concept of his ontology. By means of it Frege divides the realm of all entities into function and objects.

In this paper I try to show some fundamental difficulties relevant to the concept in hand. First of all I am interested in difference between incompleteness of the propositional functions (especially concepts) and incompleteness of the non-propositional functions (particularly arithmetical functions).

I also discuss a few other problems closely connected with the above, namely:

1) distinction between unsaturatedness of expressions and unsaturatedness of entities to which these expressions refer;

2) possibility of ontological and epistemological interpretation of incompleteness;

3) interpretation of Fregean semantical category of sense from Frege's dualistic ontology point of view.

Stefan Snihur

On existence and ontological status of the future

Two questions are the starting point for discussion contained in this article: (a) Does the future exist? (b) What is the future?

A preliminary analysis of these questions leads to the conclusion that their solution needs to introduce three principal different modes of existence characterized for objects belonging to the time sphere of being. They are: real (actual) existence (*scil*: existence of «now»), postreal existence (the past) and potential (prereal) existence. In accordance with this differentiation the answer to point (a) is generally determined by the following theses: (1) The future exists in potentiality. (2) The future exists neither in reality nor in postreality.

The notion of potential existence includes two categories of objects. The first one — objects which in fact will become real objects (present). They may be described as potential objects *sensu stricto*. The second category consists of the quasi-potential objects, that is the objects whose potentiality of becoming real (actual) ones will never come into existence.

The differentiation of categories mentioned above makes possible to formulate three definitions of the future: (D1) The future is the domain of potential, or quasi-potential objects. (D2) The future is the domain of the potential objects. (D3) The future is the domain of quasi-potential objects.

The definition (D3) is obviously inadequate; hence the solution of the problem: what is the future? — may be reduced to the choice between definitions (D1) and (D2). The arguments of the paper convince us that the adequate definition of the future is the definition (D2). First, this definition — differing from the definition (D1) — describes the future as ontologically homogeneous domain containing only objects which will become objects of the present and subsequently past objects. Second, when the future is defined by the competitive definition (D1) it is doubtful whether the language systems, referring to the time sphere of being, can fulfill the basic principles of the classical logic: the principle of contradiction and the principle of excluded middle.

Tomasz Bigaj

Remarks on three-valued logic

As it is well known, Jan Łukasiewicz invented his three-valued logic as a result of philosophical considerations concerning the problem of determinism and the status of future contingent sentences. In the article I critically analyse the question, whether the concrete form of Łukasiewicz's sentential calculus actually fulfills his philosophical assumptions. More specifically, I point out that there are some counterintuitive features of three-valued logic. Firstly, there is no clear explanation for adopting Łukasiewicz's truth-tables for logical connectives such as conjunction, disjunction and first of all for implication. Secondly, it is by no means clear, why certain classical logical principles, such as the principle of contradiction and the principle of excluded middle should not be valid for future contingents. And thirdly, it is possible within Łukasiewicz's logic to construct a simple conditional, changing its logical value from truth to falsity.

These facts justify in my opinion the thesis that three-valued logic does not satisfy philosophical intuitions accepted by Łukasiewicz. Finally I sketch the calculus which seems to be more useful to express his intuitions. It is three-valued, non-extentional sentential calculus, which nevertheless preserves all and only tautologies of the classical logic. However this calculus can be extended to a modal version, including modal expressions „it is possible that", „it is neccesary that". In such a way we obtain a modal logic with effective procedures of checking validity of its formulas.