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JSM - Method of Argumentation (Reasoning) as a Synthesis of Cognitive Process[1]

(Ulana Trylowsky, trans.)

The idea of linking various types of cognitive procedures, describing complete thought, is not a new one. It can be traced at least as far back as C. S. Peirce. Peirce investigated the creative process of putting forward a hypothesis as the consecutive appropriation of abduction, deduction, and induction. Moreover, he understood "induction" as the testing of posed hypotheses. However, Peirce saw the very act of putting forward a hypothesis as the result of abduction. Moreover, he did not formulate the means for formalizing the results of hypotheses suggesting that their comprehension relies on their explanatory strength: if the hypotheses explain facts, then those hypotheses are accepted.

JSM - Method of Argumentation (Reasoning) falls into a class of similar arguments [3] such as:

1) the conditions of their applicability can be clearly defined (even through axiomatic methods);

2) the JSM - argumentation (reasoning) is made up of a consecutive recurring realization of two types of rules of plausible conclusion, which are applied to the initial condition of the facts and to subsequent condition of the facts, resulting from the application of those rules;

3) these rules further divide into rules of application of hypotheses about reasons for effects (the set of attributes of objects) and rules of prognostication of the presence of absence of attributes in objects (rules of results by analogy);

4) the *number/set* of applicable hypotheses is accepted only in terms of the fulfillment of the criterion of adequate cause, formulated as a special axiom, regulating both the acceptance of hypotheses and the broadening of the initial sample (the opening state of the database);

5) the final stage of the JSM - Argumentation (reasoning) is the application of inductive summaries.

The following two basic theses establish the link between abduction as C. S. Peirce understood it, JSM - argumentation, and the logic of argumentation. [4]

Thesis 1: JSM - argumentation is constructive abduction.

Thesis 2: JSM - argumentation is realized as argumentational theory, based on broadened logic of argumentation (as in [4]).

Commentary on Thesis 1:

Abduction in C. S. Peirce's understanding can be presented in the following way:

D = the *number/set* of facts;

N = the *number/set* of hypotheses, explaining D;

N1 = the *number/set* of the best hypotheses, explaining D, where N1 is contained in N.

It follows that N1 is the set of plausible hypotheses.

In JSM - argumentation the applicability of the hypothesis from N, the choice of N1, and the procedure of explaining the facts from D using hypotheses from N are all formalized. The criteria of a sufficient basis for JSM - argumentation [4] form the scheme of the abductive result, in other words, JSM - argumentation is the synthesis of cognitive procedures, the unifying principle of plausible result, engendering hypotheses about reasons, rules of conclusion through analogy, abductive conclusion and, finally, inductive summaries.

Let us also note, that within the parameters of quasi-axiomatic theory [4] it is possible to use deduction. It should also be underscored that veritable values (truth, lies, vagueness, and contradiction) correspond to the four types of veritable values of JSM logic. As in JSM - argumentation, also in the logic of argumentation expressions are evaluated on the basis of comparison of the arguments "for" and "against."

From the above it follows that Theses 1 and 2 lead to a consequence: Abduction as understood by C. S. Peirce can be interpreted as constructive argumentation, and arguments ascribed to received (in the course of JSM -argumentation) hypotheses, give rise to, constructively, the force of applying rules of plausible outcome. These veritable values belong to the infinite logic of the extent of plausibility of hypotheses.

Commentary on Thesis 2:

In [4] there was offered a minimal four-stage logic of argumentation, veritable values which are engendered by means of JSM - argumentation.

This new approach to the interpretation of C. S. Peirce's abduction is not only the logical reconstruction of this idea, but also a clarification of the picture about intellectual activity, allowing its formalization in the form of:: automated intellect." This "automated intellect" is the mean for decision making, realizing the synthesis of cognitive procedures.

Note

1. "JSM" abbreviates John Stuart Mill.

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