Quadri - Dimensional Interpretation of Syllogistic Inferential Processes in Polyvalent Logic, With a View to Structuring Concepts and Assertions for Realizing the Universal Knowledge Basis

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Abstract. Modelling syllogistic - inferential processes in polyvalent logic by diachronic syllogistic structures, we realise their QUADRI DIMENSIONAL interpretation, in the paper, by relational - objectual - propertational chains convergent in diachronic spaces. Aristotle considered the definition the motor nerve of syllogistic deduction, the medium term being a definition. Leibnitz conceived the definition as the beginning and end of any demonstration, a demonstration being nothing but a chain of definition. The concept of structure, implying a topological relational approach designates the necessary relations between the elements of a system, invariant and independent of the elements, therefore formalizable the structure constituting an abstract model capable of making the rules, governing the transformations, rationally intelligible. Structuring the concepts and the assertions of scientific theories according to the rules of syllogistic definability and deductibility systems are obtained, which underlie the realization of the Universal Knowledge Basis.

1 Theoretical Basis. Conceptualizations. Formalization.

Generating systems, formalization fulfills the function of thorough analysis of knowledge fields. Concept formalization implies their analysis, contributing to their clarifying and explanation. Formalization facilitates the understanding of demonstration or theory, clarifying and consolidating demonstrations and reasoning.

Concepts can be considered results of formalization or abstraction, serving as instruments of thinking and research which enable us to save brain resources. Scientific theories consist of bodies of concepts and sets of assertions. The problem of understanding a concept or that of verifying the truth of an assertion implies a start from small number of concepts and primitive proposition named axioms or postulates. A concept can be explained or defined by means of other concepts.

The truth of an assertion is to be inferred from other accepted assertions. Starting from small number of ideas and primitive propositions, the lineal approach gives the possibility of concentrating matters of significance and truth in the initial primitive elements; it also involves typical modalities of definition and inference. If the propositions and concepts of a theory are disposed according to definability and inferability links, an axiomatic system of the theory can be obtained.

Aristotle turns definition into the motor of syllogistic inference, the medial term being a definition. According to Leibniz, definition is the beginning and the end of any
demonstration, the latter being nothing but a chain of definitions. E. Russel states that "definition is undefinable and it is not even a definite notion". In traditional logic treatises it is shown that a definition is asserted by the genus proximum et differentia specifica. As a restriction, it is pointed out that a definition shouldn't be constructed "idem per idem"; it shouldn't be tautologic as it is impossible to define the definite by means of a more developed form of the false definition "circulus in definiendo" or "diaelela" each thing should be defined by means of another, either of them being defined by other's elements.

The concept of structure designates the "constellation" of necessary relationships, invariable and independent from the elements, therefore formalizable, which offer the explanation of the "coder of all the possible transformations within the given system. A system becomes completely unintelligible if its parts are studies separately, as it has new properties, distinct from those of its components and not derivable from their sum. By constructing abstract models, it is possible to observe invariable relations which explain the structure and dynamics of systems. J. Piaget defines the structure of a system a coherent assembly of transformations, which ensures the selfregulation of a totality.

By a concept of structure as an abstract model, the rules govern transformations and ensure the functionality of a system become rationally intelligible. In the methodological strategy of structuralism, the rule of diachronic variation enables the explanation of system variations by structural variants. There is a distinction between "synchronic" which designates the relationship between coexistent terms, and diachronic" which refers to the relationship between successive terms. Therefore, structural analysis consists of a topological and relational approach.

Applying structural analysis rules, especially the immanence rule, analysis is exclusively focused on the interior of the investigated field, operating temporarily, from methodological reasons, a closing of the respective field. The interval structure of a knowledge field is established not on grounds of resembling, but of differences, by grouping and ordering differences, more exactly binary opposition, where there are complementary relations between the elements. The activity of ordering differences or binary opposition will be named dichotomic division.

Dichotomic division consists of dividing a field associated to an object into a species object and its complementary, so as the following relations should be observed:

\[ O_{00} = O_{ik} \cup O_{ik+1} \quad O_{ik} \cap O_{ik+1} = \emptyset \] (1)

### 1.1 Axioms - The Fundamentals Of Aristotelian Syllogistic Construction

Aristotle was the first to formulate ideas on the deductive method of logic. Transposing his ideas in the world of current concepts, by deductive science, Aristotle understands a system S of notions and sentences made up so that:

a) all the sentences in the system S should refer to one and the same domain of objects and relations between objects;

b) any sentences in the system S can be a true sentences;

c) if certain sentences belong to the system S, then other sentences which can be deduced from them according to the laws of logic have to belong to the system S;