

**LINGUISTICS: UNIVERSALS AND MATHEMATICAL**

*Asqarova Madina Boymurod qizi*

**Annotation.** Universals (from Latin “universalis” – general) – general concepts – are a subject matter of logicians since the ancient times. The question of universals represents the eternal issues. The nature of universals was thoroughly studied the philosophers of the middle Ages. In IX–XIV centuries the scholastics continued the discussion about the essence of universals: do they really exist or are they certain names? The supporters of realism claimed that universals really existed and preceded the emergence of singular objects. Nominalists (from the Latin word ‘nomen’ – name) defended the contrary view point. In the article we emphasize the linguistic aspect. Mathematical linguistics develops methods of learning natural and formal languages. Linguistics, logic and mathematics are closely connected. Besides, there exists psycholinguistics as well. In our paper we consider current difficult sections: logic and linguistics of non-formalized and even non-formalizable concepts, the topic closely adjacent with the one discussed in the book by T.K. Kerimov of the same name. These sections broaden the opportunities of studying complex systems of logic and linguistics. As it was noted by the authors of “Mathematical linguistics” (R.G. Piotrovsky, K.B. Bektaev, A.A. Piotrovskaya) mathematics and a natural language represent semantic systems of information transfer. Moreover, there occurred a verbal analysis of mathematical problems solution.

**Key words:** general concepts, mathematical linguistics, neural networks, mixtures.

Language universal, a feature common for all the languages, is a kind of generalization of the language concept. The existential assertion of universals gives the opportunity to formulate a more grounded theory and practice of linguistics. The language universal determination is based both on extrapolation and empirical matter. We apply a proposed “principle of external classification” and that of recognition of the phenomena which have not been recognized so far. Thus, the problems of predicting technological properties of mixtures have been solved this way since 1970 at the Mathematical programming department in Institute of Mathematics and Mechanics of the Ural Branch of the Russian Academy of Sciences, including metal manufacturing simulation problems where raw materials simulation represents a difficult problem of recognition. The fact that raw materials for the metallurgical processes are a complex structure is taken into account in these models.

At present we are solving a problem of properties recognition of material mixtures on the basis of neural networks. At the Mathematical programming department the subject of mixing (of materials, technologies, algorithms) is traditional, for example, in mining industry, in metallurgy it is seen in charge mixtures property prediction. The articles on the issue were found in Bourbaki’s [1]. Committee method applies algorithm mixing as well [2–3]. In general, the issue is related to collective decisions in operation research problems.

When modeling technical and economic problems, certain non-formalized concepts can occur, and this is when we apply identification methods based on neural networks [4].

We are considering the ancient problem of universals and general concepts on the basis of modern developments in algorithm theory and in mathematical linguistics. This issue is highly topical in its connection with the problem of factor and feature name in the problems of data and knowledge processing. We also use the general nominalism principle when modelling unique objects in the sense that we consider singular reality as a single and exclusive one. Nominalism is an interpretation paradigm providing a semantic domination of a specific singularity over the abstraction of the general.

### Structuralism

Structuralism is a set of holistic trends emerging first in the Humanities. It turned out that the first structuralists were Russian Eurasianists: N. Trubetskoy, R. Jakobson, P. Savitsky. Their researches refer to the 1920's – 1930's. First this trend emerged in the field of linguistics, N. Marr was opposing to this trend [5], F. de Saussure came up with another ideology and a bit earlier. From his point of view a language is a certain structure that does not depend on the objects it expresses. Saussure also specified the two sides of language elements exchange (e.g. words). He likened words to money: money is exchanged for material things on the one hand, and on the other hand, it is exchanged for some other sign units (money, securities). The same happens to words: on the one hand, there are links to references, on the other – there is an existence of words in the sign structure.

In this way Russian structuralism is connected with mathematical linguistics, Eurasianism, psychoanalysis. This is the Prague School of linguistics, established by the philosophers exiled from Russia. No matter how strange it may be, even J. Stalin, “the main coryphaeus in all the sciences” with his research “Linguistic questions” has a relation to this topic. In the same way, N. Marr should be mentioned who is marked by his rich imagination: he considered language as a superstructure and he developed a theory of language stageness.

This material is found in P. Sériot's book “Structure and the whole”, covering the intellectual sourced of structuralism in Central and East Europe [6].

C.Lévi-Strauss used a structural approach in ethnographic research [7]. In reality in its pure state structuralism is connected with the research of relation and operation algebra, in a certain sense this is an abstract algebra, not without reason mathematical structuralists are associated with N. Bourbaki. In the field of the Humanities C. Lévi-Strauss approached to this trend: he spoke of oppositions and correlations. F. de Saussure states about a conscious object construction, this can be considered a compliance with nominalism; according to N. Trubetskoy an object initially exists as an organic integrity and it corresponds to the realism principle. F. de Saussure states that a language has nothing but differences. Philosophical structuralism in France emerged in 1960's, becoming a fashionable trend and pushing existentialism aside [8–9].

In their very primitive form these approaches are implemented in the form of frequency analysis of words in texts. Actually it is connected with the notion of p-committees as such a system of elements where more than pth part of the elements of the system satisfies every predicate. Structuralist approach enables to formalize the non-formalized, it is shown within the mathematical synthesis of choice and diagnostics.

Unconventional formation of nonintrinsic objects (connected with controversial dispatching systems) is possible on the basis of committee constructions introduced by us and formally studied which enable to generalize the concept of object existence.

**Russian structuralism and factor analysis** when I got engaged into factor analysis, the factor name problem forced me to address to mathematical linguistics, and linguistics – to mathematical structuralism. All of this turned out very interesting for me. I had to find out how to evaluate the factor names objectively. As it turned out, the principal trends in these fields are Eurasianism,

Russian structuralism and Russian linguistics, though the forerunner of structuralism is F. de Saussure (1857–1913) [10]. Structural linguistics is a study of language as a system where all the elements are interconnected. F. de Saussure is a Swiss linguist who did the groundwork for semiotics (semiology) and structural linguistics. Semiology is a part of social psychology, it is a science of sign systems. Linguistics is a part of semiology.

Russian linguistics is rooted in European dispute about the limits between the natural and social sciences. Russian philosophers and philologists exiled by L. Lenin from Russia moved to Europe. The Russian school – the Prague School of linguistics – was established in Prague. R. Jakobson, N. Trubetskoy, P. Savitsky and others started to work. The Russian structuralism connected to linguistics emerged. Here it should be mentioned about N. Marr. A great number of questions arise but I will talk only about the most important. Marr Nicholas Yakovlevich (1864–1934), academician since 1912, Vicepresident of Academy of Sciences of The USSR, orientalist and specialist in Caucasian studies. The son of a Scottish father and a Georgian mother. Spoke many Caucasian and European languages. He is honored in Armenia and Georgia. He created “a new theory of the language” about Semitic and Kartvelian relations, developed Japhetic theory (Japhet is Noah’s son). In every language N. Marr would find a Japhetic element. In 1926 he started to draw his theory close to Marxism. He demonstrated an unlimited imagination, stating that a language is a superstructure over the social and economic basis. During the Congress of the All-Union Communist party (Bolsheviks) in 1929 he made a speech on behalf of the scientists directly after Stalin. Many thought that in 1920 he was mentally sick. In 1950 his teaching was debunked. In 1960’s the French structuralism emerged (C. Lévi-Strauss and others).

### Conclusion

The concept of universals we use in data and knowledge processes are considered in this article. The factor analysis and structuralism are applied to such processes.

### References

1. Attouch H. Homogénéisation. *Séminaire N. Bourbaki*, 1987–1988, vol. 30, talk no. 686, pp. 7–30. Available at: [http://www.numdam.org/item?id=SB\\_1987-1988\\_\\_30\\_\\_7\\_02](http://www.numdam.org/item?id=SB_1987-1988__30__7_02).
2. Mazurov V. D. *Metod komitetov v zadachakh klassifikatsii i optimizatsii*. [Method of Committees in Tasks of Classification and Optimization]. Moscow, Nauka Publ., 1990. 248 p.
3. Mazurov V.D., Hachay M.Yu. [Parallel Calculations and Committee Designs]. *Automatic Equipment and Telemechanics*, 2007, no. 5, pp. 182–192. (in Russ.)
4. Tsyupkin Ya.Z. *Neyronnye seti: istoriya razvitiya teorii* [Neural Networks: History of Development of the Theory]. Moscow, Radiotekhnika Publ., 2001. 840 p.
5. Marr N.Ya. *Izbrannye raboty. Tom 4. Osnovnye voprosy istorii yazyka* [Chosen Works. Volume. Main Questions of History of Language]. Leningrad, GSEI Publ., 1937. 328 p.
6. Serio P. *Struktura i tselostnost'* [Structure and Integrity]. Moscow, Yazyki slavyanskoy kul'tury Publ., 2001. 360 p.
7. Levi-Stross K. *Pechal'nye tropiki* [Sad Tropics]. Moscow, Mir Publ., 1984. 220 p.
8. Piazhe Zh. *Izbrannye psichologicheskie trudy* [Chosen Psychological Works]. Transl. from French. Moscow, Prosveschenie Publ., 1969. 659 p.
9. Bogomolov A.S. *Sovremennaya burzhuaznaya filosofiya* [Modern Bourgeois Philosophy]. Moscow, Vysshaya shkola Publ., 1978. 582 p.
10. Gumilev L. N. *Ritmy Evrazii. Epokhi i tsvivilizatsii* [Rhythms of Eurasia. Eras and Civilizations]. Moscow, Panteya Publ., 1993. 575 p.