

Logic as a science is about methods that serve to decide whether a given argument is or is not correct. Among many methods we have so called tableau methods. While being very effective tableau methods are usually presented in a rather intuitive way, but our ambition is to expose the method as rigorously as possible.

Hence, the main goal of the project is to develop a formal tableau metatheory for this kind of logics that can be defined by tableau tools. In such a tableau metatheory all notions should be couched in a formal and set theoretical framework. We should dispose of formal and general notions of tableau rules, branches and tableaus (maximal, open and closed, as well) that are almost constant and only their parameters vary from one set of language of tableau proofs and specific rules to another, when we apply our metatheory to construct a new tableau system for some logic under consideration. The hypothesis is that such a general and applicable theory is possible.

What comes under basic research is - by law - original research, either experimental or theoretical, taken in order to acquire some new scientific knowledge. In the field of Logic, any original theoretical work, directed toward some new scientific knowledge, may be considered basic research.

There are two aspects of significance of this research project. The direct and indirect significance. The direct significance of this project consists in a new account of tableau systems that is a generalization of the earlier works in that field, including works of the author of project, and the first comprehensive account of a formal metatheory of tableaus.

The indirect effect is that the results achieved thus far will be complemented and all possible kinds of logic can be examined in the light of construction of tableau systems. Hence, having some dispersed and partial information at the starting point, we will examine and describe the whole domain of applications, because some complete knowledge of tableau systems that kind will be delivered.

Honestly speaking, no general and formal metatheory of tableau methods has been delivered, so the project has a pioneering character. No monograph dedicated to unified, general metatheory of tableau systems has been delivered ever. This research project is an attempt to fill in this gap, since a lasting result is planned a series of English articles published in international, scientific journals.

Proper methods of mathematical logic will be applied in all parts of the research, i.e. the description of calculi, their semantics, the proofs of their soundness and completeness, the relevant kinds of semantic structures will be described. Tableau systems for the limiting cases — two-valued and propositional, then with quantifiers and next many-valued — will be defined separately, and nextly the initial tableau notions will be generalised to cover all cases — preliminary ones as well as these extending. Finally, we obtain a metatheory of tableau systems that includes notions, that are applicable to most of examples of logic that can be defined by tableaus.