

The Predicative extension of a Goal directed proof theory and its Heuristics

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Abstract

In [1] a new goal directed proof format and a heuristics were elaborated for Classical Propositional Logic. The former allows to write down into the proof the reasoning steps that are left out in the usual proof formats as they may be unsuccessful; and moreover it is a means to formulate a simple and perspicuous proof heuristics that warrants the proofs to be goal directed and efficient. Together they provide a decision method for $A_1, \dots, A_n \vdash B$ and a positive test for $\Gamma \vdash A$. To make the picture complete I will present the extension of the results from [1] to obtain a goal directed proof format and a heuristics for full Classical Logic. Again, attention will only be paid to proofs aimed to show that a specific conclusion G is derivable from a given set of premises Γ . The central feature of the proof format originates from a positive interpretation of the ‘condition’ that is attached to some derived formulas in dynamic proofs of Adaptive Logics. These positive conditions are interpreted as: a formula is derivable if certain other formulas – in the condition – are derivable from the premises. Proofs will be started by the introduction of the main goal G on the condition of itself to push the proof heuristics into the proof and to remind one that this is the formula we are looking for throughout the construction of the proof. If G itself is not a positive part of any of the premises, it will be analyzed and the search will continue for the formulas in the newly obtained condition. The notion ‘positive part’ helps to find out if the formula(s) in the condition is (are) derivable from the premises such that only relevant formulas are introduced in the proof. In order to analyse both the introduced premises as the conditions that are not a positive part of the premises, ‘formula analyzing’-, respectively ‘condition analyzing rules’ are formulated. For the predicative extension, these will lead to specific instantiations of the quantified formulas.

References

- [1] Batens D., Provijn D., 2002, Pushing the Search Paths in the Proofs. A Study in Proof Heuristics.