Nonmonotonic variants of pivotal assumptions and tableau methods

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We can find monotonic logics that serve as a bridge between classical and nonmonotonic logics. Relying on David Makinson's idea [1], these transitions can be obtained in three ways: by introducing hidden premises that work in the background, by adding deduction rules, or by distinguishing some values from the set of all classical valuations. We will concentrate on the first approach which implies the use of so-called 'pivotal assumptions'. This approach is based on the idea that we use some hidden premises in our everyday reasoning and they can be added to make the derivation performable with classical methods. To be exact, we define the pivotal assumption consequence as the classical consequence modulo a set of background assumptions. As a result, supraclassical yet monotonic consequence operations emerge and each of them is described by a small set of syntactic features. However, if we allow the background assumption set to vary, we can get nonmonotonic consequence operations.

We will use tableau methods [2] to analyze the concept of supraclassical consequence operations. Aside from Jarmużek's article [3] no research in this area has been done, therefore, this method seems new. So far tableau methods have been used only to formalize specific supraclassical systems, such as Autoepistemic Logic, Default Theories, or KLM [4]. We consider whether this approach can be extended to analyze a wide class of supraclassical logics.

The aim of this presentation is to describe tableau rules for pivotal assumption consequence operations, however focusing on a specific group called 'partial meet operations' which are nonmonotonic and intersect only some of the maximal subsets of background assumptions consistent with premises [1]. We want to analyze some of these kinds of operations in a new light. We will prove representation theorems for consequence operations and corresponding tableau systems to demonstrate the sufficiency of our considerations.

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References

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