TOWARDS CUT-ELIMINATION IN PROBABILIZED UNRANKED SEQUENT CALCULUS

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All probabilistic logic formalisms studied so far are either propositional, or permit only individual variables, i.e., variables that can be instantiated by a single term. On the other hand, theories and systems that use not only individual variables but also sequence variables (these variables can be replaced by arbitrary finite, possibly empty, sequences of terms) have emerged. There are systems for programming with sequence variables. Probably the most prominent one is Mathematica [4], with a powerful rule-based programming language that uses (essentially first order, equational) unranked matching with sequence variables [2]. The unranked term is a first-order term, where the same function symbol can occur in different places with different number of arguments. Unranked function symbols and sequence variables bring a great deal of expressiveness in a language, permitting writing a short, concise, readable code.

We make one step forward in hybridizing logical and probabilistic methods, and develop probabilized first-order sequent calculus with sequence variables and unranked function symbols. In such formalism, sequence variables, unranked terms and probabilistic primitives are available together. We probabilize the Gentzen-style inference system G, given in [3], in a similar way, as Marija Boričić probabilized classical propositional sequent calculus in [1]. We show that the new system keeps properties like soundness and completeness.

We are interested to study cut-elimination in the probabilized unranked sequent calculus. The original system G has the cut-elimination property and it is our ongoing work to prove that this priperty is preserved in the new system as well. For this purpose we follow Gentzen's original proof procedure and develop cut-elimination rewrite rules for different cases.

References

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