

Relating Logics – Cut-Free Formalization and the Interpolation Theorem

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We focus on the problem of proof-theoretic treatment of relating logics. As the first step in this direction we provide a sequent calculus adequate for the basic logic W and some of its extensions. The sequent calculus is modelled on the tableau approach developed by Jarmużek and Klonowski [1] and has similar character. The main feature of this approach is that it introduces relating formulae of the form $\varphi r \psi$ as additional elements of rules encoding essential semantic ingredient. We provide a constructive proof of cut elimination theorem and use the resulting cut-free system to prove that the respective relating logics satisfy the interpolation theorem. We will discuss also some open problems concerned with proof-theoretic characterization of relating logics, in particular:

- construction of well-behaved rules avoiding the explicit application of relating formulae;
- extension of the results to other kinds of relating logics.

References

- [1] T. Jarmużek and M. Klonowski. Some intensional logics defined by relating semantics and tableau systems. In *Logic in High Definition. Trends in Logical Semantics*, volume 56 of *Trends in Logic*, pages 31–48. Springer, 2021.