Sahlqvist correspondence for intuitionistic modal μ-calculus

Alessandra Palmigiano
University of Amsterdam

Sahlqvist correspondence theory is among the most celebrated and useful results of the classical theory of modal logic, and one of the hallmarks of its success. Traditionally developedin a model-theoretic setting, it provides an algorithmic, syntactic identification of a class of modal formulas whose associated normal modal logics are strongly complete with respect to first-order definable classes of frames.

Sahlvist's result can equivalently be reformulated algebraically, via the well known duality between frames and complete atomic Boolean algebras with operators (BAO's). Using this duality-based approach, the Sahlqvist mechanism can be the motivated in terms of the order-theoretic properties on the algebraic interpretation of the logical connectives. This perspective gave rise to a research program [1, 2, 3, 4, 5] aimed at extending Sahlqvist-type results to wide families of logics the propositional base of which is non-classical. The highlight of this research program is the algorithm ALBA [2] for the elimination of monadic second order variables, which effectively extends and unifies the existing most general resultson correspondence.

The present talk reports on an ongoing work with Willem Conradie, Yves Fomatati, and Sumit Sourabh, which extends the duality-based approach to the intuitionistic modal μ-calculus. In particular, an enhanced version of ALBA has been de

ned so that μ-formulas can be treated in which all the variables to be eliminated might occur in the scope of fixpoint binders. This enhancement is proved to be sound thanks to the order-theoretic properties of the interpretation of fixpoint binders in the algebraic semantics for intuitionistic modal μ-calculus. The syntactically defined class of recursive formulas/inequalities is presented and an informal justification is given that the enhanced ALBA is successful on this class.

References

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