HYPE: A SYSTEM OF HYPERINTENSIONAL LOGIC (WITH AN APPLICATION TO SEMANTIC PARADOXES)

HANNES LEITGEB

This lecture introduces, studies, and applies a new system of logic which is called 'HYPE'. In HYPE, formulas are evaluated at states that may exhibit truth value gaps (partiality) and truth value gluts (overdeterminedness). Simple and natural semantic rules for negation and the conditional operator are formulated based on an incompatibility relation and a fusion operation on states. The semantics is worked out in formal and philosophical detail, and a sound and complete axiomatization is provided both for the propositional and the predicate logic of the system. The propositional logic of HYPE can be shown to contain first-degree entailment, to have the Finite Model Property, to be decidable, to have the Disjunction Property, and to extend intuitionistic propositional logic conservatively when intuitionistic negation is defined appropriately by HYPE's logical connectives. Furthermore, HYPE's first-order logic is a conservative extension of intuitionistic logic with the Constant Domain Axiom, when intuitionistic negation is again defined appropriately. The system allows for simple model constructions and intuitive Euler-Venn-like diagrams, and its logical structure matches structures well-known from ordinary mathematics, such as from optimization theory, combinatorics, and graph theory. HYPE may also be used as a general logical framework in which different systems of logic can be studied, compared, and combined. In particular, HYPE is found to relate in interesting ways to classical logic and various systems of relevance and paraconsistent logic, many-valued logic, and truthmaker semantics. On the philosophical side, if used as a logic for theories of type-free truth, HYPE is shown to address semantic paradoxes such as the Liar Paradox by extending non-classical fixed-point interpretations of truth by a conditional as well-behaved as that of intuitionistic logic. Finally, HYPE may be used as a background system for modal operators that create hyperintensional contexts, though the details of this application need to be left to follow-up work.

Acknowledgements. This work was partially supported by the Alexander von Humboldt Foundation.

References

[1] H. Leitgeb. HYPE: a system of hyperintensional logic (with an application to semantic paradoxes). To appear in *Journal of Philosophical Logic*.

Ludwig-Maximilians-University, Munich, Germany
E-mail address: hannes.leitgeb@lmu.de