

## Infinite-Valued Propositional Type Theory for Semantics

Villadsen, Jørgen

*Published in:*  
Handbook of the First World Congress and School on Universal Logic

*Publication date:*  
2005

*Document Version*  
Publisher's PDF, also known as Version of record

*Citation for published version (APA):*  
Villadsen, J. (2005). Infinite-Valued Propositional Type Theory for Semantics. In J.-Y. Beziau, & A. Costa-Leite (Eds.), *Handbook of the First World Congress and School on Universal Logic* (pp. 102)

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain.
- You may freely distribute the URL identifying the publication in the public portal.

### Take down policy

If you believe that this document breaches copyright please contact [rucforsk@kb.dk](mailto:rucforsk@kb.dk) providing details, and we will remove access to the work immediately and investigate your claim.

# Infinite-Valued Propositional Type Theory for Semantics

Jørgen Villadsen

Computer Science, Roskilde University, Building 42.1, DK-4000 Roskilde, Denmark

`jv@ruc.dk`

## Abstract

In natural language semantics along the lines of Montague the simple type theory by Church functions as a kind of universal logic where possible worlds are treated as indices. The logic is also the starting point for many automated reasoning systems and is one of the traditional foundations of mathematics. However, in natural language semantics consistency cannot be assumed and a paraconsistent logic seems needed. The combination of higher order logic and paraconsistent logic has not been much investigated. We propose a paraconsistent type theory that is in a sense even a simplification of the simple type theory. There is only one basic type, namely the type of propositions, with a countably infinite universe of truth values. The system can be seen as a many-valued variant of the elegant propositional type logic by Henkin and Andrews, and it has interesting relationships to transfinite type theory.

## Acknowledgements

This research was partly sponsored by the IT University of Copenhagen.

The author is partially funded by the Danish Natural Science Research Council (the HyLoMOL project).

In UNILog'05, *Handbook of the First World Congress and School on Universal Logic*, Jean-Yves Beziau & Alexandre Costa-Leite (editors), UNINE, Switzerland (2005) p. 102

*It will be very important as we proceed to keep in mind this distinction between the logic we are studying (the object logic) and our use of logic in studying it (the observer's logic). To any student who is not ready to do so, we suggest that he close the book now, and pick some other subject instead, such as acrostics or beekeeping.*

Stephen C. Kleene: *Mathematical Logic* (1967) p. 3