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Peer Review

Review of: "A “Propositions as Types” Interpretation of Classical Logic"

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Overview

This paper presents a novel interpretation of classical logic within the "Propositions as Types" framework. The author's central contribution is a model that avoids the complexities of control operators and exception handling, which have traditionally been used to model classical reasoning. Instead, the paper leverages the polymorphic identity function and a careful analysis of type-level operations to interpret key classical principles like double negation elimination. By focusing on inhabited (⊤) and uninhabited (⊥) types and defining logical connectives through implication and universal quantification, the paper constructs a surprisingly simple and intuitive bridge between classical logic and constructive type theory, complete with explicit lambda-term witnesses for logically true propositions across first-order and higher-order logics.

Strengths and Contributions

The primary strength of this work is its conceptual clarity and simplicity compared to existing approaches like Griffin's call/cc. The interpretation of $\bot \to \bot$ as the polymorphic identity function is both elegant and powerful, providing a uniform mechanism for witnessing classical tautologies without resorting to operational features alien to pure functional programming. The systematic treatment of logical truths from propositional logic up through higher-order predicate logic, complete with witness terms, is thorough and demonstrates the robustness of the proposed model. The paper successfully argues that classical logic can be seen as constructive when proofs are interpreted as these specific, type-directed combinators (identity, instantiator, destructor) rather than as programs that compute evidence in the intuitionistic sense. This is a significant philosophical and technical contribution to the field, offering a fresh perspective on the relationship between classical logic and computation.

doi.org/10.32388/6Q701D

Declarations

Potential competing interests: No potential competing interests to declare.