Explicit Free Equational Theory Algebras Outline and Abstract

Proposed Abstract

3/13/25 EDIT: Still no abstract, though back in July of 2021, I posted the following discussion topic on the Category Theory Zullip channel about this paper's topic, which for now serves as a pretty good substitute for an abstract.

Free Algebras of Multisorted Equational Theories (July 31st Category Theory Zullip Discussion)

9/9 Proposed Contents

I. Introduction
%possibly divide introduction into subsections

II. Preliminaries
II-1. Multivariable Polynomial Functors
II-2. Multisorted $\langle \Sigma, T \rangle$-Algebras
II-3. A Word on the Adjoint Functor Theorem Derivation

III. Explicit Free Equational Theory Algebras Generated by a Subtheory Algebra
III-1. The Elementary Case: Explicit Free Equational Algebras Generated by a Σ-Algebra
III-2. The General Case

IV. Examples and Applications
IV-1. Some Elementary Examples
IV-2. Category Theory as an Equational Theory
IV-4. Explicit Free n-Categories and ∞-Categories Generated by "Multigraphs"
IV-5. Proof Systems as Free Categories Generated by Graphs
IV-6. Explicit Free Topoi Generated by a Graph Subtheory
%possibly cartesian graph subtheory
%possibly change title of IV-4 to ∞-categories
%for IV-5, give example involving propositional logic and linear logic
%involve monads

V. Lawvere Theories From a New Perspective
V-1. Free Cartesian Categories Generated by Quotient Graphs of a Given Theory

V-2. Every Lawvere Theory is Generated by Quotient Graphs of a Given Theory

VI. Conclusion
VI-1. Word on Generalizing to Languages with Diagram Signatures
VI-2. Word on Making Natural Deduction Category Theoretic
VI-3. Word on Explicit Cofree Coalgebras
%think of other possibilities.

8/28 Proposed Contents

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%divide conclusion into subsections