

Introduction to Categorical Logic

80-514/814

Suggested Topics for Student Projects

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This document will grow as we go along. Come talk to me for more information about any of these topics. And feel free to suggest others!

1. Lawvere duality

- Adamek, Lawvere, Rosicky: On the duality between varieties and algebraic theories, *Algebra Universalis*, 2003.
- Adamek, Rosicky, Vitale: *Algebraic theories*, Cambridge University Press, 2010.

2. Gabriel-Ulmer duality

- Makkai, Pitts, Some results on locally finitely presentable categories, *Transactions of the AMS* 1987.
- Adamek, Rosicky, Vitale: *Algebraic theories*, Cambridge University Press, 2010.

3. Lawvere duality in posets

- P.T. Johnstone, *Stone Spaces*, Cambridge University Press, 1982.

4. Priestly duality for distributive lattices

- Clark and Davies, *Natural Dualities for the Working Algebraist*, Cambridge University Press, 1998.

- P.T. Johnstone, Stone Spaces, Cambridge University Press, 1982.
5. Stone-type dualities for commutative rings, distributive lattices, Heyting algebras, etc.
- P.T. Johnstone, Stone Spaces, Cambridge University Press, 1982.
 - M. Makkai and G. Reyes, Completeness results for intuitionistic and modal logic in a categorical setting, Annals of Pure and Applied Logic, Volume 72, Issue 1, 10 March 1995, Pages 25–101.
6. Frames and Locales (course notes)
7. Modal Logic
- Kripke semantics for classical modal logic: various references, just ask (also a CMU MS thesis by H.-C. Kotzsch).
 - Topological semantics for modal logic: S. Awodey and K. Kishida, Topology and Modality: The Topological Interpretation of First-Order Modal Logic, Review of Symbolic Logic, 2008.
 - What is intuitionistic S4 modal logic?
 - Modal propositional logic: McKinsey-Tarski topological completeness.
 - Gödel translation of IPC into classical modal PC.