

## SyTeCi: Symbolic, Temporal and Circular reasoning for automatic proofs of contextual equivalence

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Guilhem Jaber – PPS Team, IRIF, Paris

Operational Techniques (Kripke Logical Relations and Environmental/Open/Parametric Bisimulations) have matured enough to become now formidable tools to prove contextual equivalence of effectful higher-order programs. However, it is not yet possible to automate such proofs -- the problem being of course in general undecidable.

In this talks, we will see how to take the best of these techniques to design an automatic procedure which is able many non-trivial examples of equivalence, including most of the examples from the literature.

The talk will describe the main ingredients of this method:

- Symbolic reduction to evaluate of programs,
- Transition systems of heap invariants, as used with Kripke Logical Relations,
- Temporal logic to abstract over the control flow between the program and its environment,
- Circular proofs to automate the reasoning over guarded recursive predicates.