Relational logic and its applications to verification.

How to verify several programs at once.

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Relational logic

- Relational logic started out as a means to prove program equivalence.
- Hoare quadruples - intended to express equivalence of two programs in a certain context.
- Benton's initial work - limited to structurally identical programs.
- Later, Zaks and Pnueli, cross products - again limited to structurally equivalent programs.
- Separately, self-composition - sound and complete but gives really hard verification conditions.
- This paper: serves to unite both into one that's actually machine-checkable.

Our work.

- We'd like to work with proving properties between the input and output of several calls to the same function.
- Evidently, we can't assume structural equivalence in general. For instance, conditionals may go down different branches, and loops may have different numbers of iterations.
- However, we should be able to benefit from the somewhat common structure.
- At present, we're trying to figure out judgement rules that might be useful for the kinds of things we're trying to prove.