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Least and greatest fixed points in ludics. (English) Zbl 1373.03045

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Summary: Various logics have been introduced in order to reason over (co)inductive specifications and, through the Curry-Howard correspondence, to study computation over inductive and coinductive data. The logic μ-MALL is one of those logics, extending multiplicative and additive linear logic with least and greatest fixed point operators.

In this paper, we investigate the semantics of μ-MALL proofs in (computational) ludics. This framework is built around the notion of design, which can be seen as an analogue of the strategies of game semantics. The infinitary nature of designs makes them particularly well suited for representing computations over infinite data. We provide μ-MALL with a denotational semantics, interpreting proofs by designs and formulas by particular sets of designs called behaviours. Then we prove a completeness result for the class of "essentially finite designs", which are those designs performing a finite computation followed by a copycat. On the way to completeness, we investigate semantic inclusion, proving its decidability (given two formulas, we can decide whether the semantics of one is included in the other's) and completeness (if semantic inclusion holds, the corresponding implication is provable in μ-MALL).

For the entire collection see [Zbl 1329.68032].

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