

An Introduction to Algorithmic Game Semantics

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Abstract

Game Semantics is a flexible and accurate approach to the mathematical modelling of logics and programming languages. In contrast to standard denotational semantics, games models interpret higher-order programs using first-order entities: a program is modelled as a set of sequences, somewhat akin to a trace-set. It happens that for certain fragments of higher-order imperative programming languages, equivalence of these sets is decidable. The games models are fully abstract, that is, their equational theories correspond exactly to the natural notions of program equivalence. It follows that program equivalence is decidable in these programming language fragments, opening the door to software model checking methods based directly on game semantics. This tutorial will give an introduction to game semantics and its use in deciding program equivalence in the second-order fragment of Idealized Algol.