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Functional Stable Model Semantics and Answer Set Programming Modulo Theories

Answer Set Programming (ASP) is one of the most successful declarative programming methods, which has been used in many areas of science and technology. It has well-developed foundations, efficient reasoning systems, and a methodology of use tested on a number of industrial applications. Effective computation of answer sets is largely due to intelligent grounding methods, and efficient search methods originating from the design of SAT solvers. On the other hand, this limits ASP to propositional reasoning.

Answer Set Programming Modulo Theories (ASPMT) is a recently proposed framework which tightly integrates Answer Set Programming and Satisfiability Modulo Theories (SMT). Its mathematical foundation is the first-order functional stable model semantics--an enhancement of the traditional stable model semantics to first-order formulas allowing defaults involving functions. This talk will describe how the functional stable model semantics allows us to overcome the propositional setting of ASP, and how ASPMT integrates ASP and SMT to overcome some of the computational limitations of ASP and some of the modeling limitations of SMT.

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