Developing Efficient SMT Solvers

Leonardo de Moura
One Microsoft Way
Redmond, WA
98052 USA

Abstract

Decision procedures for checking satisfiability of logical formulas are crucial for many verification applications. Of particular recent interest are solvers for Satisfiability Modulo Theories (SMT). SMT solvers decide logical satisfiability (or dually, validity) of formulas in classical multi-sorted first-order logic with equality, with respect to a background theory. The success of SMT for verification applications is largely due to the suitability of supported background theories for expressing verification conditions.

In this talk I will discuss how modern SMT solvers work, and the main implementation techniques used. I will also describe how SMT solvers are used in industry and Microsoft in particular.