

Narrowing in Rewriting Logic and Applications*

Santiago Escobar¹

¹Universitat Politècnica de València

Abstract:

Narrowing was originally introduced to solve equational E-unification problems. It has also been recognized as a key mechanism to unify functional and logic programming. In both cases, narrowing supports equational reasoning and assumes confluent equations. Narrowing has also been generalized to support rewrite theories, where each rewrite theory includes an equational theory and a collection of rules with no restrictions. Such rewrite theories axiomatize concurrent systems, whose states are equivalence classes of terms modulo the equations, and whose transitions are specified by the rules.

In the context of rewrite theories, narrowing is generalized to perform a much wider range of analysis techniques: from an equational reasoning technique to symbolic reachability analysis and symbolic model checking of temporal formulas, and also to support a much wider range of applications: from programming languages and E-unification to security protocol verification and theorem proving. In this talk, we present the current use of narrowing in rewriting logic and Maude and motivate its applications to different areas.

* This work has been partially supported by the EU (FEDER) and the Spanish MEC/MICINN under grant TIN 2010-21062-C02-02, and by Generalitat Valenciana PROMETEO2011/052.