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Conditions in Reactive Systems and in Graph Rewriting (Abstract)

Barbara König[1]

[1]Universität Duisburg-Essen

Abstract: We introduce conditional reactive systems, by enriching the reactive systems of Leifer and Milner with application conditions. Furthermore we compare to the situation in graph rewriting where application conditions play a major role.

Keywords: reactive systems, graph rewriting, application conditions

Reactive Systems were introduced by Leifer and Milner [LM00]. They provide a general categorical setting for modelling abstract rewriting: graph transformation systems, process calculi and also Petri nets can be seen as special cases of reactive systems.

In [BCKH11] we have shown how to enrich reactive systems with so-called *conditions*, by lifting nested application conditions from graph rewriting [HP09] to the setting of reactive systems. This serves two purposes: first, we enrich the formalism of reactive systems by adding application conditions for rules; second, it turns out that some constructions for graph transformation systems (such as computing weakest preconditions and strongest postconditions and showing local confluence by means of critical pair analysis) can be done elegantly in the more general setting.

It can be shown that nested application conditions in graph rewriting can be encoded into conditions for reactive systems, preserving the applicability of rules (see also [Hül10]). Furthermore one can show that the construction of weakest preconditions via borrowed context squares instantiates to well-known constructions for graph rewriting (see [Pen09]).

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