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Entailment of Non-Structural Subtype Constraints

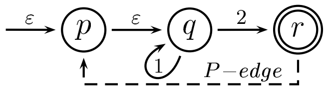
Plan of the Talk

Entailment of subtype constraints was introduced for constraint simplification in subtype inference systems. Designing an efficient algorithm for subtype entailment turned out to be surprisingly difficult. The situation was clarified by Rehof and Henglein who proved entailment of structural subtype constraints to be coNP-complete for simple types and PSPACE-complete for recursive types. For entailment of non-structural subtype constraints of both simple and recursive types they proved PSPACE-hardness and conjectured PSPACE-completeness but failed in finding a complete algorithm.

In this talk, we investigate the source of complications and isolate a natural subproblem of non-structural subtype entailment that we prove PSPACE-complete: To this purpose we introduce so called *P-automata* which extend on finite automata (see figure). We then reduce entailment of non-structural subtype constraints to the universality problem of P-automata. Based on the insights gained by this reduction, we solve the problem of non-structural subtype entailment for a restricted language.

For further information see also at `www.ps.uni-sb.de/~tim/pub.html`.

Figure P-Automation. This figure shows a P-automation which recognizes the non-context-free language $\bigcup\{\pi^+ \mid \pi \in 1^+2\}$.



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