Automata-theoretic Models of Software

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One of the problems faced by Software Model Checking is the complexity of control-flow mechanisms of modern programming languages. In particular, the combination of recursion and thread creation makes languages Turing-powerful even in the absence of data. This means that, for instance, the reachability of a given program point is already undecidable for programs without variables.

A good way of gaining insight into the complexity of control-flow is to model it using automata or formal language models. The lectures present such models and derive some complexity results.

References

[1] J. Esparza, P. Ganty. *Complexity of Pattern-based Verification for Multithreaded Programs.* POPL 2011, pp. 499-510.

[2] A. Bouajjani, J. Esparza. *Rewriting Models of Boolean Programs.* RTA 2006, pp. 136-150.